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The Scientific Review,

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SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

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RAILWAYS, Permanent Way, Rail Joints, Chairs and Sleepers, Portable Railways, Atmospheric Railways, Switches, points, Crossings, and Turntables.—A. V. Dockery, 732. F. Wirth (com.), 735. C. Wood, 818. J. C. Bunten 1014. J. S. Williams, 1056.

RAILWAYS, Carriages, Coupling, Uncoupling, and Altering Position of Carriages and Engines.—R. F. Fairlie, 877. C. Kerby, 913. J. B. C. Gougeril. F. A. Mills, 1082. R. Robinson, 1113.

REAPING, Mowing, Making Hay, Gathering in Produce.—W. P. Thompson (com.), 771. E. Dollar, 859.

REFRIGERATING, &c.—J. C. Mewburn (com.), 778. C. D. Young, 826.

REGISTERING, &c.—S. Notton, 709 E. H. Leveaux, 796. E. J. J. Comer, 833. D. Campbell, 886. J. Longshaw and T. Priestman, 1035. E. A. Beresford, 1042. W. R. Lake (com.), 1125. P. Corcoran and J. Corrigan, 1129.

ROADMAKING, &c.—J. Wheeler, 946.

SCREWS, Screwdrivers.—W. R. Lake (com.), 804. J. C. Mewburn (com.), 1084.

SEWING and Embroidering.—W. R. Lake (com.), 884. G. W. Hooper, 934. F. Simmons, 975. A. L. Deschamps, 1008. C. F. Gardner (com.), 1091.

SHEARS, &c.—H. S. Purkis, 979.

SHIP and Boatbuilding.—C. D. Norton, 955. C. Pieper (com.), 964. G. R. Shareman, 972. A. Vogt and A. Figge, 993. A. C. A. Holzapfel, 1028. E. Smith, 1034. E. P. Alexander (com.), 1099.

SHOT, Shell, &c.—W. Morgan-Brown (com.), 1019.

SHIPS (Raising Sunken or Wrecked)—J. Pullar, 710.

SIFTING, &c.—H. Brinsmead, 784. J. T. Parlour, 800. A. Brown and H. Bennett, 902.

SIGNALS, Alarms, Conmunicating Apparatus, Conveying Sounds.—R. S Symington, 872. T. Hogg, 937. E. R. Calthrop, 968. W. Hughes, 996. J. Longshaw and T. Priestman, 1035. E. Tyer, 1044.

SOAP.—J. Scharr, 723.

SPADES, &c.—J. Parkin, 1124.

SPINNING and Preparing for Spinning.—T. Greenwood and G. Pickford, 712. J. C. Mewburn (com.), 717. W. Morgan-Brown (com.), 723. J. Scharr, 728. E. Pawson, 729. T. H. Rushton and W. Dobson, 737. J. W. Wattles, 758. E. P. Alexander (com.), 764. J. Illingworth and J. Helliwell, 768. A. M. Clark (com.), 820. G. W. von Nawrocki (com.), 829. T. Coltman, 842. I. Holden, 846. T. Waddell, 849. A. M. Clark (com.), 870. B. J. B. Mills (com.), 885. W. Turner, 906. W. R. Lake (com.), 994. W. T. Whiteman (com.), 981. A. C. Henderson (com.), 1029. J. Clough, 1074. W. P. Butchart and J. Skinner, 1088. F. W. Harding, 1123.

SPRINGS.—W. K. Hydes, 714. J. A. Timmis, 831. J. Whittle and J. Brown, 1021.

STEAM Boilers, &c.—H. J. Haddan (com.), 707. W. Morgan-Brown (com.), 763. F. G. Henwood and J. H. Chapman, 775. A. M. Clark (com.). 821. C. M. Bathias, 843. A. Thomson, 857. R. Linsley, 1093.

STEAM Engines.—G. Kingdon, 746. W. Morgan-Brown (com.), 763. J. E. Phillips, 766. F. G. Henwood and J. H. Chapman, 775. D. Jay, 929. W. Morgan-Brown (com.), 952. E. Mennock, 995. F. A. Mills, 1082. A. Wallis, C. J. Stevens, and T. E. Daintree, 1109. T. E. Brigham, 1013. A. Anderson, 1031.

STEERING or Guiding Ships and Boats.—F. Bradley and E. Latham, 922. G. Guthrie, 994.

STONE, Slate, Marble, &c.—T. H. Rees, 1055.

SURGERY.—W. Merrick, 961. H. Guillery, 909.

TARGETS.—A. M. Clark (com.), 990.

TELEGRAPHS; Telegraph Printing Apparatus.—E. A. Cowper, 781. Sir C. T. Bright, 792. L. M. de B. O. Lawlor, 801. J. Imray (com.), 806. R. and M. Theiler, 827. R. S Symington, 872. T. J. Howell, 1015.

TILLING and Cultivating, &c.—J. E. Phillips, 766. J. C. Richardson, 1080. A. Wallis, C. J. Stevens, and T. E. Daintree, 1109.

TOBACCO and Snuff, Cigars, Cigar-holders, Pipe and Cigar-lighters, Smoking-pipes, Tobacco-pouches.—R. Gottheil (com.), 776. E. G. Brewer (com.), 890. W. Harmston, 1085. E. Walton, 1115.

TRAMWAYS and Tramway Carriages, Tramway Locomotives.—A. V. Dockery, 732. F. A. Mills, 1082.

TRIMMINGS.—J. C. Mewburn (com.), 858. A. J. Cresswell, 945.

UMBRELLAS, Parasols, &c.—J. Somerset and J. Walker, 874. A. F. Boham, 880. J. Miniers, 892. A. G. Aaron, 1022.

UPHOLSTERY.—E. P. Alexander (com.), 1099.

VALVES, Taps, Stop Cocks, Plugs; Regulating the Flow and Pressure of Fluids.—G. Kingdon, 746. J. G. Stidder, 791. S. Johnson and W. Hailstones, 840. A. A. Guillot, 866. C. W. Caw, 966. C. J. Little, 991. A. Gunthorpe and B. Henoch, 1086. B. Rhodes, 1107.

VELOCIPEDES, Bicycles.—T. W. Jones, 780. R. Cunliffe and C. S. Madan, 817. J. Harrington and H. Brent, 869.

VENTILATION; Supplying and Purifying Air for Buildings, Mines, Ships, Carriages, &c.—J. C. Mewburn (com.), 717. M. H. Gelling, 828. C. H. Sharp, 939. H. W. Heale, 985. E. West, 1037.

WASHING, Cleansing, and Wringing Fabrics, Yarns, and Materials.—H. Butler, 1001.

WATERCLOSETS, &c.—S. Alley, 832. S. Johnson and W. Hailstones, 840. H. Owen, 851. D. Gill, 941.

WATERWHEELS and Engines, &c.—C. Pieper (com.), 964.

WEIGHING, &c.—W. Hiscock, 744. W. R. Lake (com.), 944.

WEAVING, Braiding, Plaiting, Preparing for Weaving.—G. Keighley, 760. G. Bywater and C. Bedford, 761. J. Hollingworth, 802. J. Tinker and H. Preston, 882. J. Allman (com.), 901. J. Collins and J. Brownlee, 918. J. W. W. Shaw and J. Hornby, 1005. J. Blakley, 1048.

WHEELS for Carriages, &c.—J. Bernard, 810. W. Stroudley, 1030.

WHEELS for Machinery.—J. Parmiter, 837. W. R. Lake (com.), 1125.

WINDOW BLINDS, &c.—E. P. Purkis, 978. L. M. Orriss, 1076.

WINDOWS and Sashes, &c.—M. J. and D. M'Callum, 733. T. Wilkinson, 855. C. Kerby, 913. E. Kelly, 924. J. F. Redfern (com.), 951. A. Clark, 954. H. Brittain, 1040. H. Smith, 1052. G. A. Rhodes and J. Sullivan, 1075.

WOOD and Veneers, &c.—W. R. Lake (com.), 738. W J. Ingram, 1023. T. H. Rees, 1055.

WRENCHES, Spanners.—J. Wills, 816.

YEAST.—C. Graham, 722.

ZINC (Salts and Oxides).—J. Cawley, 1047.

RECENT AMERICAN AND FOREIGN ·PATENTS.

Messrs. Hiram D. Jewett and Israel D. Jewett, of St. Omer, Ind., have patented an improved mechanical telephone, which is so constructed as to receive the full volume and force of the voice and other sounds, magnify them, and transmit them to the instrument at the other end of the line with distinctness, so that they can be clearly heard at considerable distance from the instrument.

Mr. Marshall R. Dowlin, of North Adams, Mass., has patented an improved attachment for flexible leather covered horse collars of double harness, for the purpose of protecting the throat of or lower end of the collars from wear, and from being drawn or bent out of shape by the tension of the pole strap.

Mr. William H. Hubbard, of Red Bank, N. J., has patented an improved gate, which consists of metal or wooden bars supported at one end in a post having a friction roller at the bottom running on a rail, and at the opposite end entered into metal or wooden tubes placed in or constituting the adjoining panel of the fence, so that when the gate is opened the rods of which it is made slide or telescope into the tubes of the adjoining panel.

Mr. C. J. B. Gaume, of Brooklyn, N. Y., has devised an electro-magnetic engine in which the back pull upon its magnets is avoided. The invention consists in a new arrangement of armatures.

A simple and effective device for operating and locking and unlocking window blinds has been patented by Messrs. John Kelso and W. H. Ludewigs, of Lowdon, Iowa. The principal feature of the invention is a jointed rod, which is turned, bent, pushed, or pulled to move the shutter in different directions and operate the slats.

A simple and easily-constructed pump has been patented by Mr. A. Stoner, of Stony Point, La. This device may be made almost entirely of sheet metal, and may be used for extinguishing fires, washing windows, sprinkling floors, &c.

Mr. George Jackson, of Havre de Grace, Md., has invented a grate for coal-burning stoves, furnaces, grates, &c., which may be vibrated vertically, to free the fire from ashes, and to prevent the accumulation of clinkers.

An improved process of hardening, toughening, and increasing the homogeneous character of metal castings and alloys, has been patented by N. W. Williams, of Philadelphia, Pa. It consists in applying to the surface of the molten metal pieces of horn or other analogous material.

A barbed wire or cable for fences, having a new form of double or interlocked barb, invented by Mr. Joseph Winterbotham, of Joliet, Ill., has double pointed barb sections, bent in a peculiar manner and combined with a duplex cable, so that the barbs cannot loosen or become detached.

An improvement in rubber horseshoe pads, patented by William A. Taylor, of Washington, D. C., has a bevelled flange that projects down inside of the shoe to avoid balling, and it is capable of being expanded to suit the size of the hoof.

An improvement in suspenders, which provides for supporting both pantaloons and drawers, or pantaloons and overalls, invented by Mr. William A. Miller, of Martinsville, Ill., is contrived so that both garments will be supported properly without liability to disarrangement.

An improved roofing tile, in which provision is made for rendering the joints secure, has been patented by Mr. Edwin Bennett, of Baltimore, Md. This tile is diamond-shaped, and has marginal ribs at its two lower edges for engaging the upper ribs of the adjacent tile; it also has a channel which constitutes a rib seat, and is entirely covered by the tile which overlaps it.

Reviews.

CARR ON DOMESTIC POISONS.

"Our Domestic Poisons; or, the Poisonous Effects of Certain Dyes and Colours used in Domestic Fabrics." By HENRY CARR, M. Inst. C.E. London: William Ridgway, 169, Piccadilly, W. 1879.

THIS is an interesting little work upon a subject of the very highest importance to all of us. Mr. Carr sounds the alarm, and warns us of the dangers attendant on the use and adoption of many things that are articles of common use and enjoyment, and in lucid terms shows how the poisons he refers to are often insidious and minute in character. He reckons arsenic to be the chief of these poisons, and affirms that it may be easily detected. There are (he says) two processes by which arsenic is brought into contact with the system—the one by dust, the other by gas. As regards dust, we have valuable information from Dr. Alfred S. Taylor, late Professor of Chemistry and Medical Jurisprudence at Guy's Hospital, as follows:—

"The pigment of arsenicated wall-papers contains a large proportion of arsenic, and from some of these papers in the unglazed state the noxious material may be easily scraped or removed by slight friction: thus arsenic is liable to be distributed through the air of the room in a state of fine dust." He detected this poisonous dust on books, picture frames, furniture, and projecting cornices of rooms thus papered. The workmen who hang these papers or strip them off the walls are well known to suffer from symptoms referable only to the action of arsenic. One gentleman, as stated by Dr. Taylor, who had his library papered with an arsenicated wall-paper, suffered from symptoms of arsenical poisoning, which came on after he had been occupied in dusting his books, and on examination a well marked quantity of arsenic was found in the dust.

With regard to the gaseous combinations of arsenic, we have the authority of Dr. H. Fleck, of Dresden, who thus reports on his experiments: — "Unmistakable cases of poisoning have arisen from inhabiting rooms hung with arsenical wall-papers, where, on account of the character of the paper, or for other reasons, it was impossible to ascribe the poisonous effects to portions of the colouring matter mechanically detached. For this reason, and because in certain cases the odour of garlic had been noticed in rooms thus papered, it was long suspected that there was actually generated, under some circumstances, arseniuretted hydrogen.

"Experiments were made on a paper coloured with Schweinfurt-green, an aceto-arsenite of copper. Starch paste was used to fix the colouring matter on the paper, and also to fasten the paper to the inside of a large tabulated bell glass.

"The bell-glass thus lined, and while the paste was still moist, was placed upon a well-ground glass plate; the bell-glass was hermetically closed, and the apparatus was left to itself for three weeks. A growth of mould appeared between the paper and the glass sides, and the air within the jar acquired a musty odour. At the expiration of the three weeks, a slow stream of air was passed through the jar, and the presence of arsenic was shown conclusively in the air, as it issued from the apparatus. The arsenical compound thus present in the air, gave, with a solution of salt of silver, the ordinary reaction of arseniuretted hydrogen. A similar experiment, in which was employed a flask, coated on the inside with a mixture of gelatine and Schweinfurt-green, gave a similar result. It was found that a mixture of arsenious acid and starch paste gave rise to the formation of arseniuretted hydrogen; but no arsenic could be detected in air which had been in contact with a mixture of arsenious acid and water without the presence of any organic material."

From these and confirmatory experiments, Dr. Fleck concludes that there can be no longer any doubt of the possible presence of arseniuretted hydrogen in the air of a room hung with paper which is coloured with Schweinfurt-green; that the evolution of this gas takes place on account of the joint action of moisture and of organic matters (especially such substances as are used in fixing the papers to the walls); and that wherever free arsenious acid is in contact with organic substances, the evolution of the gas is possible. The danger, then, is by no means confined to Schweinfurt-green, but may arise from any colour which contains arsenic.

Mr. Carr goes on to state that wall-papers are not the only delinquents, nor are bright green colours the only ones that give off poisons. Dress fabrics, gloves (the bronze green in particular), stockings, bed curtains, ball dresses, and other things have secret death-power clinging to them; and, as a practical issue of his work he advocates further legislation for suppression of the sale of poisonous articles.

THE SERIALS.

"House and Home."—This is a new periodical devoted to sanitary matters and hygiene, addressing itself specially to the working classes, but not restricted to the advocacy of the interests of those classes. The following, taken from the programme, will afford our readers, as far as we can judge from the numbers already issued, a good notion of its character and contents:—

"To the violation of known sanitary laws in the construction of houses is mainly attributable a large proportion of our zymotic diseases, and from these evils no class in society enjoys immunity. Victims are taken alike from the palaces and hovels of our land. It is because of this that sanitary house construction is one of the most pressing needs of the day; and, as all classes are suffering from the present unsatisfactory condition of things, so all classes are equally interested in the application of sanitary science to the construction of houses. We shall keep our readers informed upon this interesting branch of sanitary science.

"The evils, the miseries, the sufferings of overcrowding, cannot be confined to the immediate victims of the vicious system, and the sooner this is known generally, the sooner all classes in society will unite in earnest efforts for its eradication. The epidemic engendered in the crowded court or alley spreads to the houses of the well-to-do, and even to the mansions of the affluent. Our endeavour will be continually to direct public attention to this social ulcer.

"It is one of the hopeful signs of the times that attention has been directed in real earnest to improving the dwellings of the masses. Already much has been done, at least in the way of experiment; and efforts in this direction, initiated by benevolent individuals, have been imitated and extended by the application of the principle of association, until, from very small beginnings, 'a movement' has sprung into existence which now enjoys legislative sanction and aid. To this 'movement' a large portion of our attention will be directed. We shall endeavour, as rapidly as our space will allow, to make our readers fully acquainted with what has hitherto been done in this field of enterprise and philanthropy, whether by individual effort, by associations, or by legislative provisions."

We can only add that we wish *House and Home* the success it deserves.

"Night and Day."—This journal, which, amongst much information interesting to philanthropists, records the progress of Dr. Barnardo's good works at the East-end of London, gives evidence of increasing vitality, and affords us hopes that the institutions under Dr. Barnardo's management are increasing in prosperity.

RUTLEY ON PETROLOGY.

"The Study of Rocks; an Elementary Text-Book of Petrology." By Frank Rutley, F.G.S., H.M. Geological Survey. London: Longmans, Green, and Co., 1879.

THIS little volume forms one of the series of text-books of science. The author of this excellent little book has sought to supply a want that, there is no doubt, has long been felt for the guidance of geological students in this particular branch of science, and we think he has in a great degree effected what he aims at. Of course the student, as the author very plainly states, cannot learn petrology by merely reading; but with the aid of this work he will, we think, be greatly assisted in his study. We cordially recommend this work to the attention of students.

POSTPONEMENTS.—Amongst several Reviews postponed are—"The Shadow of the Coming Truth" (published by Elliot Stock); "Chemistry of Common Life," by James F. W. Johnstone, new edition by H. A. Church (published by W. Blackwood and Sons); and "The Patentee's Manual," by Messrs. Johnson (published by Longmans).

A NEW AND IMPORTANT MINERAL.

ABOUT the first of December of last year, says C. F. K., in the *Scientific American*, Dr. Henry Wurtz received a specimen of a newly discovered mineral, said to occur in considerable quantities in Utah, where it is found in veins of pipe-clay. This mineral is of a dark brown colour, and waxy feel, and is easily impressed by the finger nail. Dr. Wurtz made a preliminary examination, and found that it fuses at a little over 70° C., and evidently consists of a number of homologues of the paraffine series, such as those found in Europe in Moldavia and Galicia. It is the first deposit of the kind known on this continent, and may prove of great value to that section of the country.

Cold ether dissolves about 12 per cent of a soft paraffine of greasy consistence, and having the colour of burnt sienna. It becomes transparent on melting, and resembles the urpethite of Johnston.

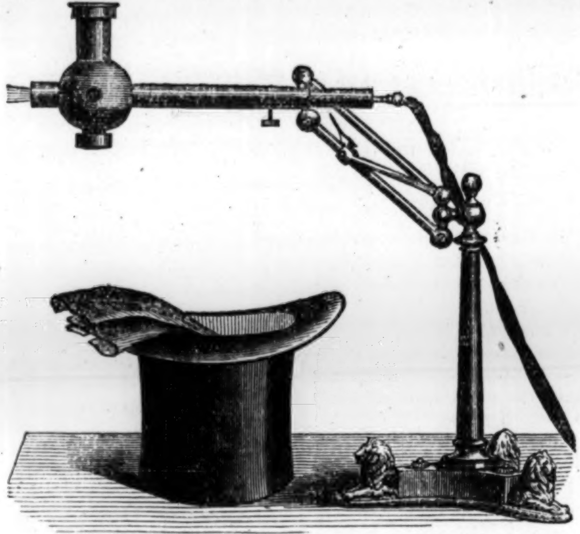
Boiling ether dissolves about 37 per cent, and leaves on evaporation a hard, waxy material, somewhat darker than the first portion. It is probably to be classed with ozokerite, notwithstanding its apparently greater hardness.

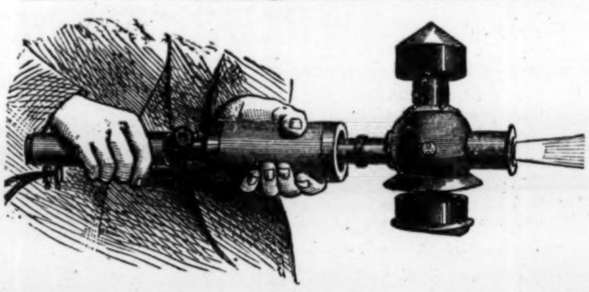
The third portion, insoluble in boiling ether, and comprising about 52 per cent of the original mass, in very dark brown and decidedly harder than beeswax. It appears to approach in character the Moldavian species of zietriskisite, but its melting point is somewhat lower. Lack of sufficient material has hitherto prevented Dr. Wurtz from determining the various points of interest with satisfactory precision.

A wind motor for the heavier kinds of work, such as pumping large quantities of water, operpting stamp mills, &c., is the invention of Mr. L. Brayman, of Gilbert Station, Ill. It consists of two series of wind wheels placed on horizontal shafts, which are arranged at right angles to each other and geared together so that either or both series may be employed in driving machinery

THE ELECTRIC LIGHT.

Mr. Balmanno Squire, senior surgeon to the British Hospital for Diseases of the Skin, delivered a lecture at the Royal United Service Institution on the 13th ult., on the adaptation of the electric light to military and naval surgical practice. The contrivance he exhibited, of which we give an illustration, consisted of a remarkably small light and portable hand-lantern containing in a tube projecting from the back of it (which tube served also as a handle for the lantern) a Jablochkoff candle. By means of a screw contrivance fitted in the tube the burning end of the electric candle could be advanced forward into the lantern as the candle gradually burnt back. This, with two connecting screws for attaching the electric wires, formed the whole of the apparatus. A minute window formed of dark-blue glass placed at the side of the lantern formed the means of ascertaining from time to time the exact position of the burning end of the electric candle. Two of these lanterns were exhibited, the one constructed under the lecturer's directions by Messrs. Weiss, of the Strand, the other similarly, by Mr. Mayer, of Great Portland Street. Mr. Squire pointed out that the initial cost of the whole plant need not exceed a hundred pounds, while the cost of the electric candle does not exceed fourpence per hour. The lamp burns for an hour and and a half without change, and can be recharged within half a minute. Mr. Squire, by the aid of elaborate diagrams (prepared by Mr. Shoolbred, C.E., and by Mr. Latimer Clark, C.E.) of the various systems of electric lighting, showed the special advantages presented by the Jablochkoff system of furnishing a small hand-lantern of this kind. He advocated its use as a means of affording a powerful and steady light in the dark cockpit of ships of war, where, during a naval engagement, a rapid succession of operations, some of them of the most delicate kind, had to be conducted by the naval surgeon under the dim illumination of a cumbersome lantern containing a solitary paraffin candle. He also advocated the use of his electric lantern for similar reasons in military field-hospitals, where the same conditions present themselves during a night encounter, and pointed out that, while for military purposes the necessary electric and and steam engine conveyed on the same carriage would be far lighter than an ordinary piece of field artillery, yet for naval purposes the requisite steam power was always on board, and on most war-ships the necessary dynamo-electrical machine was already in use for electrical illumination against torpedo practice. The force required to generate the light he placed at only one and a half horse-power.





A NEW BEETLING MACHINE.

An improved beetling machine has recently been invented by Mr. J. Patterson, of Belfast, Ireland, and exhibited in Paris at the late Exhibition by Messrs. Mather and Platt, of Manchester. It is designed to impart to linen, cotton, and woollen goods the necessary degree of finish by means of a series of weights or hammers beating rapidly and with equal force on the material, as it passes over a cylinder of wood and metal. The hammers are moved by eccentrics on a common shaft revolving in the upper portion of the machine.

There are three cylinders for carrying the goods. They revolve slowly in journals formed on two large wheels, one cylinder only being exposed to the action of the hammers at a time. The goods may be removed from or adjusted on two of the cylinders while the fabric is being treated on the third, without stopping the machine, thus rendering the action of the machine continuous. The destructive effects of the shocks on the machine itself are materially lessened by the springs which support the weights. In the old machines, in which a series of weights were lifted by as many cam wheels, and then allowed to drop, the highest number of blows obtainable per minute from one hammer was 80. In the improved machine, when running at full speed, each hammer strikes about 420 equally effective blows.

The peculiar construction of the machine allows a perfect regulation of the number as well as the force of the blows. In Paris a machine with 14 hammers did the work of 7 of the old machines in the same length of time, furnishing goods of superior finish.

NEW PATENT LEGISLATION.

The following article, which recently appeared in our esteemed contemporary, the *Chemical News*, gives such a just view of the new Government Patent Bill, from an independent standpoint, that we have much pleasure in presenting it to our readers:—

Among the many remedies proposed for the present depressed condition of British manufactures, it is more than strange that such an immense majority overlook the simplest means—the encouragement of invention by giving increased facilities for obtaining and retaining patents. When we consider what we owe to invention in the past; when we further reflect that our most formidable manufacturing rivals possess a patent law in most points superior to our own, and that they ascribe to this patent law a very great share in their rapidly-growing industrial prosperity; when we reflect on these things, it does indeed seem to us surprising that patent law reform is not recognised as *the* question of the day.

Our present patent system, though possessing certain meritorious points, labours under very serious drawbacks. Its capital defect is the exorbitant cost of obtaining and upholding a patent, which amounts to £175 in stamp duties alone. It is very true that of this sum £50 are payable before the end of the third and £100 before the expiration of the seventh year respectively. But this plan of periodical taxes, non-payment of which at once renders the patent void, is fatal to the most essential element in the value of every kind of property, viz., security. It is not to be expected that manufacturers will pay a royalty to work a patent which if they only wait for a year may perhaps be thrown open to the world.

If we turn to the United States we find that there one payment of 35 dollars secures to an inventor the absolute right to his ideas for a term of seventeen years. Can we wonder if under such a system working men spend their leisure in trying to devise some improvement, some new "notion" of a useful character, and that foreign inventors are rapidly learning to consider America as the most favourable field for the practical development of their ideas?

Our national apathy on this most important subject is, however, not quite universal. Messrs. Anderson, Mundella, Dalrymple, and Alex. Brown are bringing in a Bill which, should it become law, will be a very great improvement. The duration of patents is proposed to be extended from fourteen years—the present limit—to twenty-one. The stamp duties are to be reduced to £85, of which £10 are payable on obtaining the patent, £25 at the end of seven years, and £50 at the end of fourteen years. Patents already in force may be extended to twenty-one years, and shall be exempt from the payments formerly prescribed at the end of the third and of the seventh year, if not already due, and shall be liable merely to the payments prescribed in the new scale. These proposals, if carried out, would be a boon alike to inventors and to the nation at large. There is extension of time, reduction of cost, and though the vicious system of successive duties is not wholly abandoned, yet every patent, not otherwise voidable, is safe for seven years, which will give the patentee some chance at least of getting it adopted in practice.

Unfortunately, in opposition to this wise and moderate Bill, a measure is now brought in under the auspices of Government which

"——keeps the word of promise to our ear
And breaks it to our hope."

The duration of a patent is to be extended to twenty-one years. But this boon is to be purchased at a cost of another £100, payable at the end of the *twelfth* year for the very suspicious reason alleged in the memorandum of explanations that the "public"—*i.e.*, pirates—"may have long notice of the patentee's intention to renew beyond the fourteen years." We almost fear that in these words lurks a possibility that the continuance of a patent for the remaining seven years may be opposed. The stamp duties payable on obtaining the patent are, indeed, to be reduced to £12 10s., but with the further duties at the third, seventh, and twelfth year the total cost will be increased to the enormous sum of £262 10s., whilst the opportunities lapsing from non-payment will be increased from two to three. As a still further blow to security of possession we find the following most mischievous clause:—"A patent shall be liable at any time after the end of three years from its date to be revoked on either of the following grounds:—(*a*) That the patentee fails to use or put in practice the invention to a reasonable extent within the United Kingdom, or to make reasonable efforts to secure the use or practice thereof there, proof to the contrary whereof shall lie on him; or (*b*) that he fails to grant licences to proper persons requesting the same, on terms which the Lord Chancellor deems reasonable."

When we remind our readers that in the general opinion of practical men it is decidedly exceptional for a patent to be brought into operation so early as the third year, except the inventor happens to be a capitalist, they will agree with us that this clause, if not in intention a cunningly-devised proviso for the confiscation of patent right, will act as such in practice. Men who would otherwise have come to terms with the patentee will, if this clause becomes law, wait till the third year has expired. We admit that a patentee who works his invention in some foreign country and refuses to do so in the United Kingdom might justly be held to have forfeited his rights. But this end could surely be attained without in substance enacting that no poor man shall hold a patent for more than three years.

To give the introducers their due, the Bill contains a few good features. The time of provisional protection before giving notice to proceed is extended to nine months, and if a stamp duty has not been paid at the proper date from accident or mistake the Lord Chancellor may, on petition, enlarge the time so as not to exceed three months longer. We know instances where patentees for want of this arrangement have been compelled to apply for a private Act of Parliament—a most costly remedy. There are also increased facilities for amendment, disclaimer, &c., even after sealing.

Still, notwithstanding these minor improvements, if we consider that the cost of a patent, instead of being greatly reduced, will be augmented, and its character of permanence within the allotted term as greatly decreased, we can only pronounce this measure a step in the wrong direction, which it is the duty of all friends of the industrial progress of the nation to oppose by every means in their power.

STAINING FLOORS.

THE *Furniture Gazette* commends the following method of staining floors in oak or walnut colours: Put 1 oz. Vandyke brown in oil, 3 ozs. pearlash, and 2 drms. dragon's blood, into an earthenware pan or large pitcher; pour on the mixture 1 quart of boiling water; stir with a piece of wood. The stain may be used hot or cold. The boards should be smoothed with a plane and glass-papered; the cracks filled up with plaster of Paris; with a stiff brush, dip in the stain, and rub this in well; the brush should not be rubbed across the boards, but lengthwise. Only a small piece should be done at a time. By rubbing in one place more than another an appearance of oak or walnut is more apparent.

Correspondence.

LIGHTING AND HEATING.

TO THE EDITOR OF THE SCIENTIFIC AND LITERARY REVIEW.

SIR,—May I ask you to kindly insert this letter (if not too lengthy) in your widely-known paper.

Being the discoverer of "a valuable composition," as my patent agents term it, for lighting and heating, I wish to know if your columns are open to correspondence relating to the above subject, and seeing that it must be of the highest interest to the public for the prevention of accidents by fire, the explosion of dangerous spirits through the upsetting of lamps, &c., and it will prove a valuable aid in all sanitary works, I venture to hope it may be worthy of a little space in your columns to enable me to better describe and bring before those interested the advantages of the discovery.

As the composition in question, when it becomes fully understood and appreciated, is quite likely to alter and revolutionise the method of lighting and heating as at present carried out with liquid fuels, such as with hydrocarbons and the dangerous spirits distilled therefrom (its peculiar value being the entire and perfect safety from explosions in the use of spirits for lighting purposes).

Its various applications in the arts and sciences other than those above stated are of an extensive nature, and will form no doubt many volumes of subject matter as time rolls on, and I confidently anticipate very important branches of industry springing up as it becomes better known, arising from this new principle, "artificial porosity combining the utmost absorption power," and one of the burning questions of the present day, namely, sanitation in all its bearings, may now be solved and disposed of by the adoption of this new principle.

I think I may also remark I have a great surprise in store for the Meteorological Society in the shape of an entirely new method of calculating the rainfall of the country, by which the fraction of an inch may be readily registered.

If by thus ventilating this subject and its various applications in the arts and industries it tends to benefit us as a nation I shall consider myself well rewarded.

For years have I plodded on striving in my poor way to bring projects and improvements out for the public, but only to experience defeat; yet I have at last succeeded in gaining one step forward, and it is now for me to make the most of my time.

In conclusion I beg to remark that could I but obtain the co-operation of some practical scientific and energetic men in carrying out any one or all my national schemes, so much the more inspiriting to your humble servant, as it is not reasonable to suppose that I, single-handed and poor, can undertake such immense areas of possible work, the tenure of life being so doubtful.—I am, &c.,

GEO. H. LILLEY.

24, Broughton-road, Stoke Newington,
March 14, 1879.

THE AMAZON RIVER.

TO THE EDITOR OF THE SCIENTIFIC AND LITERARY REVIEW.

SIR,—Would you allow me to ask whether, amongst the many surveyed routes for uniting the Atlantic with the Pacific, it has ever been contemplated by means of the Amazon River and its numerous tributaries, to effect it? B.

Mr. Lawrence Klemm, of Terre Haute, Ind., has patented an improved apparatus for cleaning middlings by means of a force and suction draught.

MOVEABLE BRIDGES.

By JAMES PRICE, M. Inst. C.E.

IN a paper read at the meeting of the Institution of Civil Engineers on the 11th March, Mr. Bateman, president, in the chair, Mr. Price stated that the term "moveable" was used as being more general in its application than any other. Such bridges mostly occurred where delay of traffic was to be avoided. Hence rapidity of movement and minimum of repairs should be sought. There should be no unnecessary weight; for this reason steel was preferred to iron as a material, saving 25 per cent. of the weight of the parts strained. Moveable bridges were divided thus: 1st, bascules; 2nd, swings; 3rd, traversing; 4th, lifts; 5th, pontoons. 1st. Bascules were illustrated by the railway bridge over the Ouse at Selby, erected in 1839. The largest of this kind had been opened at Copenhagen in 1867. Overhead beam bascules were much used in Holland, the beams being usually of timber. The author had erected a large single flap bascule over the Shannon to carry a railway; the floor was open to let the wind through when the flap was raised; it acted well. 2nd. Swing bridges formed the most important class, and all large structures in Europe and America belonged to this type. Double passages were preferred, as obviating heavy counterpoise and wind stress; instances of both occurred in the South Bridge, Hull. Swing bridges were classified thus:—Those that turned on rollers only; those that turned on rollers and a centre pivot; those swung entirely on centre pivots; those lifted on a water centre and tilted; those relieved by hydraulic pressure acting upwards at the centre; and floating swings. Unlimited hydraulic power available for turning was not conducive to obtaining light and well designed structures. The earliest swing bridges were of timber; then cast iron was employed, and now they were universally of wrought iron. The Brest Bridge having two leaves, spans the largest passage crossed by any moveable bridge; it turned on rollers. To the same class belonged also the railway bridge over the river Ouse at Goole, which was almost the largest railway moveable bridge; it crossed two passages of 108-feet span each. There were several bridges of this kind at Birkenhead. The Duke-street bridge rested on rollers five feet in diameter; it was not balanced over the centre, and was difficult to open. Athlone Bridge, over the Shannon, had rollers only eight inches in diameter; it worked badly. The great majority of swings turned on rollers and a centre pivot, including all the large American bridges; the most notable was the Raritan Bridge, a double swing, with two passages of 216 feet in each. This bridge, which had been erected by the Keystone Bridge Company of Philadelphia, was peculiar for being lifted entirely off its abutment supports, thus needing no wedging up. To this class belonged also the tilting bridges generally adopted in France, at Dunkerque, Gravelines, Havre, Cette, and Toulon. The same type had likewise been adopted in North Germany. The principle might be described thus: The whole bridge being slightly out of balance, each leaf or the heavy end was set up by various methods; and when the abutment support was withdrawn, it dropped on two or more wheels, the main weight, however, being carried by the centre pivot. A bridge of peculiar construction had been erected at Grimsby to carry the Manchester, Sheffield, and Lincolnshire Railway; it had no tail end, or counterpoise; it was anchored at the pivot, and bore with a pressure of 122 tons on a pair of wheels near the edge of the passage. The Dutch type belonged to those turned entirely on certain pivots. They were to be seen at Rotterdam and Velsen, on the North Sea Canal. The girders were under the roadway; and the point of support was brought above the centre of gravity by means of a long cone passing up between the girders. In those lifted on a water centre and tilted, the leaves were slightly out of balance. When the centre was raised by hydraulic pressure, the bridge tilted so as to bear on wheels. In some cases, as at Leith and at the Albert Dock, Hull, the tail end was heavier, and dropped with its wheels on to a tramplate. Or, as at Marseilles, Millwall, Stobcross (Glasgow), &c., the tail end was lighter, and rose in titling till its wheels bore against the underside of an inverted tramplate fixed round its sweep. The dimensions and arrangements of the Leith and Marseilles bridges, which were constructed in the same year (1874), were compared. Swing bridges, relieved at the centre by hydraulic pressure, were represented by the Tyne Bridge, which was the largest and most perfect in this country, having two passages of 110 feet each. Floating swings, as constructed by the author in Dublin, were used, one to carry a double carriage road, and the other a single line of railway; the latter acting also as a turntable for waggons, so as to shoot them across the dock entrance. The principle was to support nearly all the weight on a submerged buoy, which turned on a centre pivot on the bottom. These bridges were effective, and suitable for places where the foundation was bad. Traversing bridges required much power. The larger ones were represented by the bridge at Swansea, over the River Tawe, in which the heavy end was across the passage. In swing bridges that turned on rollers, by withdrawing the supports from the long end the tail end rose till the wheels came level with an upper traversing rail, upon which the bridge was rolled back. In the case of the Millwall Dock, the centre was raised by hydraulic power, and the light end, which crossed the passage, was held down by horns, that prevented its rising; hence the heavy end rose to the proper level to be rolled back. There were many other forms of traversing bridges, the best for a railway and manual power being at the Dovey Viaduct. Mr. Kinniple's submerged caisson was also a traversing bridge, the wheels taking the portion of weight not buoyed up, running on rails laid in the bottom; it bore the same relation to other traversing bridges as floating swings did to other types. The balancing of both swing and traversing bridges should be as nearly as possible over the centre, otherwise, particularly in the former, motion was difficult. The proportional lengths of tail ends of swings varied. In the Marseilles Bridge the tail was to the passage arm as 0·62 to 1; in the Brest Bridge, as 0·50 to 1; and in the South Bridge, Hull, as 0·40 to 1. These represented extreme and mean cases. If possible, the counterpoise should form some useful part of the bridge, such as cross girders and flooring combined, in the form of a solid cast-iron floor. The modes of setting up the ends were various, consisting of wedges, inclined planes, toggles, weigh shafts, eccentrics, hydraulic lifts, screws, &c. The Phœnixville Bridge Company had a self-adjusting joint of the rails, something similer being used at Keadby Bridge. At Marseilles there was a bridge which was a combined bascule and swing. The first motion of the centre ram lifted it off the bearings only for being swung; but it could be further lifted till a part of the bridge turned round a horizontal axis; and it allowed barges to pass without being swung, thus saving much time. Lift bridges, which rose bodily and allowed a passage for canal boats, were not common. One had been erected over the Surrey Canal, and another by the author, which worked well and easily. The author had charge for many years of an ingenious pontoon bridge, erected by Mr. Robert Mallet, M. Inst. C.E., which worked most satisfactorily; it was now done away with, a portion of the canal which it crossed having been filled.

RORKE'S DRIFT.

Dedicated to Major Gonville Bromhead, in command of the eighty men of the 24th Regiment, at Rorke's Drift, and all its gallant defenders, who during the whole night of the 22nd January, fought valiantly, and defeated 3,000 Zulus already flushed with the slaughter at Isandula, and saved the honour of the British arms!

Oh, sad's the fate that's fall'n the brave!
Oh, dark's the day that's ope'd the grave!
In Zululand our banners wave,
But dire's the life that's lost.
The lives of heroes, nobly well
They fought, till one by one they fell.
How hard they died—ah, who can tell?
As martyrs 'mid the host.

In myriads came the savage foe,
And ere the sword could shield the blow,
Their blood began to ebb and flow:
They speared them side by side.
With fiendish yell they wildly pressed,
And bared each hero's dying breast;
As bravely all, in glory blessed,
They fought, and nobly died!

Then,—ere the darkness of the night,
With hearts of gore, and hands to smite,—
Fresh from the carnage of that sight
To darker deeds of blood!
On, on they rushed in thousands there;
Soon, soon a deadlier fate to share;
Deaths' death, was well revengèd where
The gallant eighty stood!

All night they fought, nor fought in vain,—
All night the foe fell on the plain,—
All night they charged, and charged again;
And wildly rushed to death!
Like lions stood our gallant crew;
A band of warriors, bold and true,
As spear, and bayonet changing, drew
The dying soldier's breath.

Long, long in battle's bright array,—
Long, long until the break of day,—
Long, long they kept the foe at bay,
Who fell, to rise no more.
That night heroic deeds were done,
By many a true born British son!
That night a victory was won
In arms unknown before! †

All honour to the brave who fell,—
All glory give to those who tell,
How dire's the fate their foes befel,
Ere rose the morning sun!
Strew o'er the dead the cyprus bough;
Wreathe ye the laurels round each brow.
Of those who live, the victors now:
For Bromhead led them on!

Henry George Hellon.

* This gallant officer is descended from a family of heroes. The baronetcy was conferred in the year 1806 on Lieut.-General Gonville Bromhead for a similar victory to that of Rorke's Drift, viz., that of holding an important position in a most determined manner during the American war. Colonel Boardman Bromhead fought at Quebec against the French under General Wolfe, and was the first who told him of the victory as he lay dying on the battlefield. The father of the present Major was a Waterloo veteran — the late Sir Edmund de Gonville Bromhead, of Thurlby Hall, Lincolnshire. The eldest son, Capt. Bromhead, went through the Crimean War, and died whilst serving with his regiment at Burmah. The second son, and present baronet, Sir Benj. Bromhead, is now with Sir Samuel Browne at Candahar. The third son, Major Charles Bromhead, of the 24th Regiment, is a most distinguished officer, and won glory and his majority in the Ashantee campaign. The author of the poem is indebted to a member of this distinguished family for the preceding information.

† "To our intense relief, however, on nearing the Buffalo River, the waving of hats was seen from the inside of a hastily-erected intrenchment, and information soon reached me that the gallant garrison of this post, some eighty men of the 24th Regiment, under Lieutenant Bromhead, and a few volunteers, the whole under Lieutenant Chard, R.E., had for twelve hours made the most gallant resistance I have ever heard of against the determined attack of some 3000 Zulus, 370 of whose dead bodies surrounded the post." — *Vide Lord Chelmsford's Despatch.*

THE USES OF FERNS.

Those who have been fairly inoculated with the love of ferns, will be interested to learn that many species of these beautiful plants are used not only for food and medicine, but for economic purposes. As food, they are chiefly useful to the aboriginal inhabitants of some foreign countries. In the larger of the exotic ferns—the tree-like species—the inner part of the stem, stipes or rhizoma—corresponding to what would be the pith in other plants—and sometimes the whole of the tuberous rhizoma, is eaten generally after being boiled. In India, some of the natives boil the tops of one species of fern, and eat it with shrimp-curry. Amongst ourselves, two of the most beautiful species—the bracken and the male fern—are said to have been sometimes used as ingredients in the manufacture of beer; whilst one foreign species (*Aspidium fragrans*) is actually stated to have been used for making tea. Our native maidenhair used at one time to furnish a principal ingredient for a syrup called "capillaire." . . . The rootstock of the royal fern (*Osmunda regalis*), was in times gone by reputed to possess the quality of healing wounds, whether applied to them externally, or taken inwardly in the form of a decoction. Its outward application was considered a specific against bruises or sprains, and good for bones broken or out of joint; and, taken inwardly, it was also believed to be good for cholic and for splenetic disorders. In some parts of Europe its rootstock is said to be used, after being boiled in water, for the purpose of starching linen. . . . A pleasant and familiar inhabitant of our lanes and woods—the common polypody—*Polypodium vulgare*) has had ascribed to it, by ancient herbalists, various medicinal qualities, amongst them being the power of curing coughs and asthmatic affections, the dried rhizomas being powdered for the purpose and mixed with honey. —*The Fern World.* By Francis George Heath.

THE GIFT OF INVISIBILITY.

It is not surprising that some three hundred years ago a good deal of mystery was believed to surround the seeding of ferns. It was superstitiously considered that these plants were propagated by invisible seeds, although it was thought that the 'black spots' which were found on the backs of their fronds had something to do with their seeding capacities. It was believed that these 'black spots' fell suddenly upon the ferns on Midsummer Eve, and that if they were then gathered under certain conditions they would produce on the gatherer some very potent effects, the chief of which would be the ability to walk invisible. To get the gift of invisibility, however, it was necessary to proceed to 'catch' the fern seed in the following way. Twelve pewter plates were to be taken at midnight of St. John's Eve, and placed under the 'black spotted' frond. The seed then in falling would pass through eleven of the plates, and rest on the twelfth. Fairies, however, were sometimes in attendance to snatch the seed away as it fell. But if the gatherer succeeded in his attempt, he would thereafter possess the much-coveted quality of invisibility.—*The Fern World.* By Francis George Heath.

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SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

President, SIR ANTONIO BRADY.

[SESSION 1878—1879]

Members' Meetings—at 8.15 p.m.—

Thursday, April 10th.—Patent Law Conference, and (if possible) Exposition of Inventions.

Thursday, April 24th.—Exposition of Inventions, and, if requisite the Patent Question.

Executive Council Meetings at 7.30 p.m.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

MEETINGS OF THE EXECUTIVE COUNCIL were held on 27th February (Sir Antonio Brady, President, in the chair) and on 13th and 27th March, at which the subject of the International Agricultural Exhibition was reconsidered, and the Government Patent Bill discussed (see March number SCIENTIFIC REVIEW, page 41, and also remarks thereon in the present issue). Further information on this subject will be reported in our next.

THE MEMBERS' MEETING on the 13th March is fully reported in another column.

MEMBERS OF THE INSTITUTE ADMITTED SINCE LAST PUBLICATION.

Messrs. S. Aldred, H. Avison, E. Belmer, W. Bell, J. Burbridge, J. H. Barry, W. M. Bullivant, W. B. Brooker, O. Barnsdale, E. Barnes, H. Brittain, R. Cosslett, E. Chism, T. Castle, C. Cowdery, C. Camoyano, B. Craig, J. Davies, W. Davis. Sir H. De Burgh Lawson, E. M. B. Faull, H. Fergusson, J. Greenfield, T. Greenwood, H. Greener, E. C. Gooddy, Rev. J. Gilmore, W. C. Hughes, H. W. Hemsworth, T. W. Helliwell, T. Holliday, R. Healy, H. P. Hayhoe, T. Hampton, R. Hadfield, G. Holloway, James Howard, E. Hall, D. Johnson, H. Lee, J. S. Lowe, H. Lee, A. Le Grand, G. G. Lawrence, J. W. Light, H. Levinge, S. J. McMechan, J. Mosedale, J. Madocks, S. Nelis, A. Plambeck, Hon. J. W. Plunkett, H. Portway, A. Porecky, F. J. W. Packman, M.D., T. M. Robertson, B. W. Rogers, Major H. B. Rodway, J. Robinson, F. S. Snowdon, E. Smith, G. Schofield, E. Simpson, T. Suffield, D. Stewart, J. Stenson, R. Scott, J. Scharr, W. Thompson, W. H. O. Taylor, T. P. Worthington, W. M. Ward.

Monthly Notices.

Prof. Clifford.—The death of Prof. Clifford, one of the most brilliant men Cambridge has turned out of late years, has been announced. Born at Exeter and educated at King's College, Strand, and at Cambridge, he was Second Wrangler in 1867 and became a Fellow of Trinity. But his academical distinctions by no means represented his true powers. He was admitted on all hands to be the most remarkable mathematician of his generation, and promised to be a second Cayley. His general acquirements, too, were singularly great. An ardent High Churchman in his undergraduate days, he rushed, says the *Athenæum*, shortly before taking his degree, to the opposite extreme, and threw himself—too eagerly, perhaps, for one of his delicate constitution—into the religious controversies of the day. He contributed to the *Fortnightly*, *Nineteenth Century*, and other magazines, a number of articles which, whatever may be thought of their views, were written with remarkable ability and a passionate energy of conviction which commanded attention if they failed to convince.

Prof. Sonnenschein, the celebrated chemical analyst, died recently at Berlin, in the sixty-second year of his age.

Assistance to Prof. Nordenskiold's vessel, imprisoned in the ice, is intended to be sent, and Capt. Heinrich Sengstake, first lieutenant of the Germania steamer belonging to the German North Pole Expedition, has been appointed to the command of a steamer now building at Malmo, which is to start in May for Behring Straits *via* the Suez Canal and Indian Ocean, and endeavour first to carry assistance to the Vega, Prof. Nordenskiold's vessel.

The P. Le Neve Foster Testimonial, in consequence of the lamented decease of that gentleman, is being kept open for further subscriptions, for the advantage of Mrs. Foster, the circumstances in which she is left being such as to demand a fresh effort to increase the fund for her benefit. Subscriptions may be paid to the credit of the fund at Messrs. Robarts, Lubbock, and Co., or at Messrs. Cox, Biddulph, and Co.; or they may be sent to the Secretary of the Society of Arts. Cheques should be made payable to the "Foster Testimonial or Order," and crossed Robarts, Lubbock, and Co.

Scientific works will shortly be published by Messrs. Crosby Lockwood & Co., comprising a revised edition of the late Dr. Noad's "Student's Text-Book of Electricity," with an introduction and additional chapters by Mr. W. H. Preece, M.I.C.E., Vice President of the Society of Telegraph Engineers. The same firm have in preparation a "Treatise on Metalliferous Mines and Mining," by Mr. D. C. Danes, author of a "Treatise on Slate and Slate Quarrying," and have in the press a "Pocket-Book of Formulæ, Rules, and Tables for Naval Architects, Shipbuilders, Surveyors, and Marine Engineers," by Mr. Clement Mackrow, A.I.N.A.

For election into the Royal Society the number of candidates is fifty-three. In the course of the next month the Council of the Society will select fifteen to be proposed for election in June.

Technical studies at Cambridge are the subject of a proposed scheme for remodelling the examination in applied science for the ordinary B.A. degree. More of this will, we suppose, be heard shortly.

A Compass with a Nickel Needle.—The *Comptes Rendus* informs us that Joseph Wharton has sent to the Académie des Sciences a marine compass with a nickel needle. Four such compasses have been placed on Russian cruisers, and a fifth is to be placed on a French ship for comparison with steel needles.

Mr. J. R. Christie, F.R.S., F.R.A.S., died suddenly on the 28th of February, at the age of sixty-five.

Dr. Page, F.G.S., Professor of Geology in the University of Durham, died in the sixty-fifth year of his age, at his residence, Newcastle-on-Tyne. Prof. Page is well-known to the public by his "Introductory Text-Book of Geology," his "Advanced Text-Book of Geology, Descriptive and Industrial," and by his "Handbook of Geological Terms and Geology," each of which has passed through two or three editions. Dr. Page was long connected with the Messrs. Chambers, of Edinburgh.

The Scientific Review.

APRIL, 1879.

THE COPYRIGHT QUESTION.

Copyright, being analogous to Patentright, is often referred to by Inventors to show how favourable the law is to authors, whilst, as we all know, the British Law of Patents is constantly objected to as embracing provisions which, instead of being advantageous to inventors and proprietors of patents, operate strongly to their injury and loss. As far as literary copyright is concerned, this comparative excellence is tolerably clear, for anyone who writes a book, whether coming within the category of scientific or other literature, is by law *ipso facto* the proprietor of the copyright, unless he has written the book for another person, who is therefore the proprietor. The proprietorship is not dependent on any registration or similar process, though it is true that a very curious kind of registration is provided for; but this may be effected *for a few shillings* any time before bringing an action for infringement, and on this slender piece of officialism some decisions injurious to the rights of authors have been given. Indeed, the principal objection to our copyright system is the want of sound internationality. Copyright in music and dramatic productions, however, is not so free from objection; but then it must be remembered that to these productions the right attaches of excluding the performance of them for fee or reward, which alters the complexion of the matter.

One branch of copyright, which is termed art copyright, embracing the protection of paintings, drawings, and photographs, cannot be considered as having the same satisfactory aspect as literary copyright has, for, by the present law, neither the artist nor the purchaser of the *original* has the copyright, unless a special agreement be made between them; in fact, in the absence of such agreement it appears to be *in nubibus.*

Lately the copyright question has been much discussed, a Royal Commission having been appointed which has made a report embodying various recommendations, upon which action has been taken by artists assembled at the Grosvenor Gallery and by the Royal Academy.

A fair statement of the *pros* and *cons* of the case has been recently put forth in the *Athenæum*, from which we will now quote:—

The Commissioners, after referring to the difficulties with regard to portraits and replicas, say:—"Upon the whole, the majority of us have arrived at the conclusion that in the absence of a written agreement to the contrary, the copyright in a picture should belong to the purchaser, or the person for whom it is painted, and follow the ownership of the picture."

The artists, however, say that the copyright should be theirs, for the following reasons:—

That the purchaser has all he bargained for in the undisturbed possession and enjoyment of the picture itself. That he cannot be called on to give it up for the purpose of engraving, but is free to keep it, sell it, or even destroy it if he pleases.

That the value of the copyright is contingent and prospective, and is created by and dependent on the subsequent fame of the artist, who would lose a great inducement to devote himself to elaborate and important work if the copyright in previous works were not assured to him.

That if the sale of an early work by an unknown but promising painter contributes to his rise in popularity, the purchaser is rewarded for his discrimination by a proportionate rise in the value of the work he has bought.

That if the copyright is given to the purchaser the artist has neither control over nor share in the profits of the engraving of his work, whereas if the copyright be given to the artist, the purchaser can still make his own terms for lending the picture to the engraver, and the value of the picture itself is enhanced by reason of its being engraved.

That the artist is the natural and jealous guardian of his own fame, while the possessor for the time being of a picture, who might be a trustee, a married woman, the assignee of a bankrupt, or even the committee of a lunatic, would often be unwilling to take legal proceedings for the repression of piracies and unworthy engravings.

It cannot be denied there is considerable force in some of these reasons, and if (as we gather from the memorial of the Royal Academy is the case) the artists are willing to forego their claim to make replicas, we think they have made out a strong case. The question of replicas has been a stumbling-block in the way of giving the copyright to the artist. There have been cases in which purchasers, after giving a large price for a picture supposed to be unique, have found that it was only one of a series, and not even the original.

Bad as this is, it must be remembered that artists who have sinned in this way have generally been tempted by picture dealers, who, finding a certain work popular, will bespeak more "of the same pattern." It is well known in art circles that a dealer, now dead, used to give commissions for replicas in these very words. It must also be remembered that as far as the general public is concerned, replicas, which are after all the handiwork of the master and have their value as such, are not so mischievous as imitations and copies made by others, which, except for purposes of fraud, have no intrinsic value of their own, and it is evident that if the artist sins himself he will be keen to prevent others from so doing.

The French and Belgian artists are agreed that having sold a work of art, they should not without consent be permitted to repeat the design, "sous la même forme artistique," and we think our artists must submit to a somewhat similar restriction. Translations by engraving or in a different material are, of course, not prohibited, as they tend to increase the value of the original work by making it better known.

The question of portraits need hardly create great difficulty. The Royal Commissioners have recommended that in the case of photographs taken on commission no copies should be sold or exhibited without the sanction of the person who ordered them, and a similar clause might easily be framed to prevent the unauthorised publication of engravings, photographs, or copies of portraits.

Were the copyright given to the artist subject to these limitations, our law would be substantially in accord with the existing law in Germany and with the recommendations of the International Congress of Paris, a matter which may be of no small moment in facilitating future conventions, and it would, we think, on the whole encourage a loftier aim in art.

We echo the sentiments of our cotemporary. Authors, artists, and inventors should have all just legislative encouragement to the utmost.

HIGGINS'S ELECTRIC LAMP.

At the Members' Meeting of the Inventors' Institute held on the 13th of March, 1879, Mr. M. Zingler in the chair, the Secretary, Mr. F. W. Campin, stated that the subject for consideration appointed for the evening was the electric light, being in continuation of the paper he had brought before the Institute at a former meeting. He had hoped to have had before them this evening illustrations of various new lamps; but one arrangement for electric light that he specially desired to bring under notice—an invention of Mr. F. H. Varley—was not yet ready, and several other recent improvements were, it appeared, in a similar condition. However, Mr. F. H. Varley, though not prepared to exhibit and describe his own invention, had been able to find a present substitute, as to which he would read a paper

Mr. Varley then rose and stated:—The lamp which I have the pleasure of exhibiting to-night, through the kindness of Mr. Leslie C. Hill, C.E., is the invention of Mr. Higgins. It has often been said that simplicity of construction is rarely obtained without wading through the complicated maze of mechanical actions, and in order to effect a desired end we frequently resort to the most complicated machinery for effecting a very simple process. Nothing is more true than this with regard to electric light lamps and regulators.

A constant and regular feed of carbon and a regular distance between the carbon poles has hitherto been the end and object of all electric light regulator inventions. To accomplish this the clockmaker was requisitioned along with the physical instrument-maker, and a very ingenious and elaborate piece of mechanism was in many cases the result. The first, as many of us are aware, to produce a light sufficiently steady for illustrating at the lecture-table was the invention of Foucault and Dubosq. It is difficult to describe this regulator without the aid of diagrams. For many years this lamp was the only one of its kind that at all deserved the name of a regulator. I merely give a brief description of its construction, that those who are not acquainted with the lamp may form some idea of its mechanism.

In this lamp there are two distinct motors, one to separate the carbons and the other to bring them together. Each of these consists of a complete train of clock-work. An electro-magnet is placed below these on the base of the apparatus. For controlling the movement of these motors, which is effected by the attraction or releasing of the armature, when the current flowing from carbon to carbon has acquired given strength, the armature is attracted, pulling forward a lever which retards the train work and stops the carbon from approaching the carbon that burns away, and the electric arc increases in length until it arrives at a point where the resistance is sufficiently augmented to allow the armature to be pulled off by a counteracting spring. This position of armature releases the approach motor, and the carbon gradually shifts into the regulated position. If they exceed this, then the retreating motor is liberated and draws the carbons apart. Thus by this electro-magneto balance controlling two distinct pieces of mechanism the light is maintained between the carbon-points.

The next lamp of this description is the Hefner-Aterneck, which is much in use in Prussia. For general purposes, the Serrin regulator is preferred, being of much stronger construction and more easily kept under control. This regulator is the one employed in illuminating the Strand outside the Gaiety Theatre. Independently of the fact that these regulators are costly, they are so complicated and delicate in their construction that they require experienced persons to make them work properly, and if they get out of order, require a skilled workman to correct the defects.

Now, in the lamp which we have before us the several requisites necessary for a constant and steady light are obtained in the simplest manner conceivable. In the stem of the lamp there is an iron tube, surmounted by a small cistern or reservoir. This tube and cistern or reservoir are filled with mercury, the cistern being made of the requisite size. In order that the mercury shall not rise and fall more than one-tenth of an inch with the immersion or withdrawing of the carbon pencils (samples of which are on the table), this mercury, you will perceive, floats the carbon in the most perfect manner possible, and by this means, therefore, it can be pressed into contact with the upper carbon-pole, which is made of a much larger size than the carbon-pencil. The electric current is made to pass through the carbon-pencil and the upper pole, by means of the mercury connection on the one hand and by the outer casing of the lamp as the second connection. If, therefore, I put on the current, the light is at once established. Now the light produced is essentially that of an intense incandescence.

The greatest accumulation of heat takes place at the point of contact between the carbon-poles, gradually decreasing downwards. This accumulation of heat has a very useful property, for it not only increases the resistance, which means *light-giving power*, but that same heat causes the carbon to burn off more rapidly at the point of contact, the rate of the disintegration diminishing in a regular manner, and the effect is to maintain a constantly pointed carbon effect, the resistance of a fine point giving out a greater incandescent effect, and hence by this lamp we have a perfectly steady light, without flickering.

Now, in order to preserve a fine point, it is necessary that the pressure exerted in keeping the carbon in contact is not too great. This is most avowedly effected by the floating column of mercury. Were the pressure great, the fine point is bruised or crushed, and the maximum effect is not obtained. Now, this can be regulated at will, and once established, it remains constant. It is also obvious that as the mercury serves as a contact, there is no necessity to use contact springs. Such springs render a lamp of this description a very imperfect regulator that holds the carbon when it is moving up, instead of allowing it to slide freely, and the carbon-pencil generally bounds up to the fixed pole with sufficient force to break a nicely-made point.

The essentials of a lamp of this description are, first, good contact with the carbons, and light but regular feed of the carbon-pencil. Such, then, we have in this invention, which is the acme of simplicity.

The light was exhibited during the reading of this paper, two lamps being placed on the table before the Chairman, and warm approval was accorded to the invention by those present, the steadiness of the light and the total absence of all change in its colour being much in its favour.

The lamps continued to burn with the utmost steadiness throughout the evening, and yielded a light of many candle power each, as nearly as could be judged by the eye, no photometric test having been made. The brilliancy was, of course, much greater when the opaline globes were removed. Each lamp was supplied from 30 litre Bunsen cells, so that the division of the current was unnecessary.

In accordance with the Chairman's invitation to those present to take part in the discussion, remarks were made by several gentlemen present.

Mr. **Lane Fox** stated that he considered a carbon pencil arrangement would never be able to compete with gas. Light from incandescence, he thought, presented a problem which was not at present solved. Amongst other things, there was the difficulty of getting rid of the oxygen; and the lamp shown, although a very superior one, seemed to him to have some drawbacks; for instance, he did not see the means of controlling resistance.

M. **Le Baron Molardi** having been solicited by the Chairman to favour the meeting with some remarks, stated that although he had nothing to offer antagonistic to the invention exhibited, he would abstain from any comments, as he considered many gentlemen he saw around him could far better discuss the invention before the meeting than himself.

Mr. **Leslie Hill** observed that with regard to Mr. Lane Fox's remark, one great advantage of this lamp was the use of a low power. The resistance was only one unit. He considered that Mr. Fox's ideas of the difficulties attendant on such a system of electric lighting as that pertaining to this lamp were exaggerations, and that in practice they were of very small account.

Mr. F. H. **Varley** here remarked that he relied upon the practical illustration he had placed before them. There was low tension, and every one present would be able to see that there were many advantages not possessed by other inventions. As to his own invention, he could not, and at the present time he thought he ought not, to say anything.

Mr. **Cadett** remarked that although he had no wish to depreciate the invention brought before the meeting, yet there were several points which ought to be well considered before a conclusion in regard to its practical value could be properly attained; and he entered into a detailed statement on the subject, and particularly with regard to experiments he had made with the Siemens lamp, and he had brought one with him, but, unfortunately, found the arrangements made for illustrating Mr. Higgins's lamp did not allow of his exhibiting the Siemens lamp in operation.

Mr. **Varley** then stated that electric light by this system was cheaper than by the arc system, and pointed out that there were no extreme variations, and other advantages would doubtless be recognised by those present.

Mr. **Douglass** said that as Engineer to the Trinity Board he had some acquaintance with the electric light and its advantages for lighthouse purposes, and he was convinced that for such purposes no luminary was equal to it. The two lamps on the table pleased him very much, and he could not help saying that he had not seen any that he considered superior to them.

Mr. F. W. **Campin** (the Secretary) considered that too much importance could not be attached to the fact that whilst the production of the electric light as they had seen it applied to public illumination necessitated the employment of a steam engine, with all the attendant expense of engineers, coals, and buildings, the light which they now saw was produced from a simple battery, which could be set up near any private mansion, and would require little attention during an entire evening, although the inventor did not restrict himself to the use of battery power.

Mr. T. Varley, Mr. Smartt, Mr. T. Waller, Mr. Greenfield, Mr. Pritchett, and other gentlemen took part in the proceedings.

Votes of thanks to Mr. F. H. Varley, to Mr. Hill, and Mr. Higgins being proposed by the Secretary and seconded by Mr. T. Blanchett, were passed by acclamation, and with a vote of thanks to the Chairman the proceedings terminated.

Mr. Otto Stark, of New York city, has invented an improvement in bellows for accordions and other instruments of the same character. The improvement consists in strengthening the folds by means of wooden strips.

Proceedings of Societies.

ROYAL SOCIETY.

FEB. 20TH.—W. Spottiswoode, Esq., D.C.L., President, in the chair.—The following papers were read: "On Electrical Insulation in High Vacua," by Mr. W. Crookes; and "On the Reversal of the Lines of Metallic Vapours, No. IV.," by Profs. Liveing and Dewar.

FEB. 27TH.—W. Spottiswoode, Esq., D.C.L., President, in the chair.—General Thuillier was admitted into the society. The following papers were read: "Studies in Acoustics, I. On its Synthetic Examination of Vowel Sounds," by Messrs. W. H. Preece and A. Stroh; and "On the Reversal of the Lines of Metallic Vapours, V.," by Profs. Liveing and Dewar.

MARCH 6TH.—W. Spottiswoode, Esq., D.C.L., President, in the chair.—The list of candidates into the society was read. The following papers were read:—"Observations on the Physiology of the Nervous System of the Crayfish (*Astactus fluviatilus*)," by Mr. J. Ward; "Preliminary Report upon the Comatulæ of the Challenger Expedition," by Mr. P. H. Carpenter; and "On the Characters of the Pelvis in the Mammalia, and the Conclusions respecting the Origin of Mammals which may be based upon them," by Prof. Huxley.

MARCH 13TH.—W. Spottiswoode, Esq., D.C.L., President, in the chair.—The following papers were read: "The Influence of Electricity on Colliding Water Drops," by Lord Rayleigh; "Second Paper on the Influence of Coal-dust in Colliery Explosions," by Mr. W. Galloway; and "On the Contact Theory of Voltaic Action, III.," by Profs. Ayrton and Perry.

GEOGRAPHICAL SOCIETY.

FEB. 24TH.—Sir R. Alcock, V.P., in the chair.—The following gentlemen were elected Fellows: Admiral Sir A. C. Key, Rear-Admiral F. S. Tremlett, Major-General D. J. F. Newall, Rev. E. A. Davies, Messrs. R. Berridge, M. Clark, H. P. Fane, W. D. Fane, J. T. F. Halligey, O. P. Möller, J. E. Singleton, G. Seaton, E. Wilkinson. The papers read were: "On the Basin of the Helmund," by Mr. C. R. Markham; and "On the Mountain Passes leading to the Valley of Bamian," by Lieut.-General E. Kaye.

MARCH 10TH.—Sir R. Alcock, V.P., in the chair.—The following gentlemen were elected Fellows: Earl of Northbrook, Marquis of Stafford, Major R. A. Clement, Lieut. F. E. Walter, Messrs. A. W. Borman, W. Douglas, F. Francis, J. Forbes-Mitchell, T. P. Greene, and H. P. McClatchie. The paper read was "On the Second Circumnavigation of Lake Nyassa," by Dr. J. Stewart.

ASTRONOMICAL SOCIETY.

MARCH 14TH.—Lord Lindsay, M.P., President, in the chair.—Messrs. M. Homer, A. E. Heims, E. E. Markwick, and C. C. Walker were elected Fellows. Mr. Knobel read a paper "On a Persian Manuscript by Ulugh Beigh in the possession of the Society." The manuscript is badly written, but the writing throws light on the discrepancies which have been pointed out by Prof. S. Newcomb in the accounts of early Arabian eclipses. Mr. Gill read a paper "On the Corrections for Astronomical Refraction;" and a lengthy discussion followed on a paper of Mr. Sadler's, published in the January number of the "Monthly Notices," giving a list of errors in Admiral Smith's "Celestial Cycle," Prof. Langley, of the Alleghany Observatory, U.S. America, who was present at the meeting, gave an account of some recent observations he had made on the character of the sky for astronomical observations at an observing station on the slopes of Mount Etna. According to his experience there was great want of steadiness about the atmosphere, but there could be no doubt as to the increased clearness with which faint objects could be seen. For example, under ordinary circumstances, he could only count with the naked eye six stars in the Pleiades, while from Mount Etna he had been able to count nine. The conditions were also excellent for the observation of such objects as faint nebulæ. The following papers were also laid on the table and partly read:—"Observations of Encke's Comet, 1878," by Mr. J. Tebbutt; "Les Longueurs du Pendule à seconde à Poulkova, à St. Pétersbourg, et aux différents Points de la Russie Occidentale, corrigées de l'influence produite par la flexion des supports du pendule construit par M. Repsold," by Prof. A. Sawitsch; "A Formula for reducing Precession in Right Ascension and Declination from Bessel's to Struve's Constants," by Prof. A. Krueger; "Observations of Absorbing Vapours upon the Sun," by Mr. E. L. Troulevot; two papers by Mr. Lynn, one "On the Change in the Errors of Hansen's Lunar Tables between 1848 and 1876," and the other "A Note on η Draconis;" "On the probable presence of Oxygen in the Solar Chromosphere," by Mr. A. Schuster; "On Systematic Errors in Right Ascension depending on Magnitude," by Mr. Gill; "On the Computation of the Heights of Lunar Mountains from Photographic Measurements," by Prof. C. Pritchard; and a "Note on Gruithusen's Lunar Crater 'Schröter,'" by Mr. J. Birmingham.

BRITISH ARCHÆOLOGICAL SOCIETY.

FEB. 24TH.—Mr. T. Morgan in the chair.—It was announced that the Council had resolved to undertake some excavations at Castor, Northants, on the supposed site of the Roman station Durobrivæ, with a view to recommencing the work of exploration left by Mr. Artis fully fifty years ago. A sum of money had been collected and a local committee was in course of formation in aid of this object. The Rev. Dr. Hooppell exhibited the impression of an inscribed title recently found at Binchester during the excavations now in progress there. Mr. W. Smith described a fine flint implement found by him in the north of London in gravel from the bed of the Lea. Mr. T. Morgan produced some fragment of Castor ware from the side of the Roman station. Mr. L. Brock exhibited fragments of two Roman tesselated pavements found during the last fortnight in course of building works. One was from Billiter square, and the other from the south side of Cheapside. No care appears to have been taken of them, and they were cut through and carted away as soon as discovered. The first paper was by Mr. G. Patrick, who entered into the history of Burleigh House with great minuteness, illustrating his subject with many plans and views, including some of old date, as well as copies of Thorp's plan. The question of Thorp having been the architect was discussed, and the evidence is in favour of this, although there is evidence that Gresham brought materials for the work from Flanders, and that Gresham's architect directed this part of the work. The dates 1577, 1585, and the latest, 1587, occur on the building, and thus disprove the belief that the house was not erected for Lord Burleigh, but for his son. There are historical evidences of the existence of an earlier house, and traces still exist. The second paper was by the Rev. C. Collier, who described the Roman villa recently discovered at Itchen Abbas, Hants. Within very limited space three beautiful tesselated pavements have been found, and traces of brilliant wall paintings. A resolution was passed that it was desirable to preserve the remains by enclosing them with walls and a suitable covering.

MARCH 5TH.—Rev. S. M. Mayhew in the chair.—The Rev. Prebendary Sir B. Baker exhibited drawings of a singular Roman vessel of brown earthenware found by Col. Akers near Chatham. It is of unique form, having apertures at both ends designed for raising and retaining water by suction, after the manner of the later mediæval watering-pots. Mr. C. Brent described a forged inscription on marble from a celebrated collection. Mr. L. Brock exhibited a specimen of Egyptian glass recently found in Cyprus. It is a small phial covered with wavy lines of black worked in the material. The Chairman exhibited a collection of objects of Spanish glass, others from Venice, and a beautiful specimen, a mask with a background inlaid as if with silver. These were described at length by Mr. S. Cuming. Mr. E. Way described a collection of articles found in excavations at Princes Street, and Mr. Compton exhibited some old family plate. The first paper was by Dr. Phené, descriptive of the Cave of the Oracle of Delphi. He described the grand scenery, and illustrated the approach from Corinth by a large number of views. The cave is cut in the living rock, and is 36 feet by 24 feet, with a height of about 25 feet, the angles being nearly to the cardinal points. This has been described as a bath by various writers, but there are no steps, as has been stated, down to the rapidly-flowing stream which passes through a cavity at one end. After the descriptions of ancient writers and a careful survey of the locality, the lecturer adduced proofs to show that this is the veritable cave of the Oracle. In the end wall before the stream there exist numerous recesses which would have rendered effectual service for all purposes of the oracle. The position of the Castalian Fountain was treated of at length. A discussion ensued, in which Mr. Cuming, Mr. Horman-Fisher, and many others joined. The second paper, by Mr. C. W. Dymond, was descriptive of the little known monument at Gunnerkeld, near Shap.

SOCIETY OF ENGINEERS.

MARCH 3RD.—Mr. C. Horsley, V.P., in the chair.—Messrs. C. A. Wells, J. Haswell, C. Harper, and J. J. Musto were elected members. A paper was read by Mr. J. Bernays, V.P., "On the New Pits and Hauling Machinery for the San Domingos Mines in Portugal."

NUMISMATIC SOCIETY.

FEB. 20TH.—J. Evans, Esq., D.C.L., President, in the chair.—Messrs. J. H. Blundell and H. Erhardt were elected members. Mr. Frentzel exhibited a collection of copper coins of George III., consisting of about 250 varieties, many of them being curious forgeries; also ten varieties of the Pretender's halfpenny, 1760. The Rev. Canon Pownall exhibited three pennies of William Rufus, from the Tamworth find, one of which, struck at Worcester, had a double circle in the centre of the cross on the reverse. The Hon. J. Gibbs, of Bombay, sent for exhibition photographs of zodiacal gold mohurs and of forged imitations of the same. Mr. P. Heward exhibited a series of Chinese coins commencing with specimens of the Knife money, which is believed to be of very remote antiquity. His collection was accompanied by a descriptive catalogue. Mr. Webster showed a drachm of Antiochus VIII. struck at Tarsus, and having the so-called "Tomb of Sardanapalus" on the reverse; also a penny of the Earl of Warwick (*temp.* Stephen), of the Bristol Mint. The coins were also laid upon the table by Mr. Webster: a triple sovereign of Charles I., type of Snelling, Pl. vi. No. 10, but with "1644 ox."; an unpublished two-guinea piece of Charles II.; a pattern seven-shilling piece of George III., 1798, struck on a half-guinea *flan;* and a pattern dollar of Queen Victoria, struck for Hong Kong, 1864. Papers were communicated by Mr. H. Webb, "On Early Silver Coins of Charles II."; by Mr. C. Patrick "On Medals relating to the

Battle of Culloden;" ard by Mr. S. L. Poole "On Unpublished Arabic Coins from the Collection of the Rev. T. Calvert.

LINNEAN SOCIETY.

Feb. 20th.—Prof. Allman, President, in the chair.—Messrs. E. A. Fitch, L. Scott, and W. Stone were elected Fellows. The Rev. G. Henslow exhibited portion of an elm bough having a pulley centrally imbedded. Exteriorly all traces of its presence were obliterated, and the wood growth indicated thirteen years after entrance of the foreign body. Mr. R. B. Shape showed and commented on a series of rare birds. Among those from New Guinea were skins of *Paradisea Raggiana*, collected by the Rev. Mr. Lawes; of others, obtained in the Fijis by Baron von Hugel, were species of the genus Pinarolestes, which also inhabit Tutuela, one of the Samoan Islands. Mr. W. H. Fitch passed round a coloured drawing of a remarkable large crimson-coloured pitcher, twelve inches long by nine in circumference, of *Nepenthes sanguinea*, grown at Bury by Mr. O. Wrigley. A paper was read by Dr. H. Trimen, "On the Genus Oudneya, Brown." This is is a small cruciferous shrub, discovered by Dr. Oudney in the desert between Tripoli and Mourzuk. The genus has been obscure in consequence of Brown's short insufficient diagnosis. This latter Cosson has shown to be a Moricandia, hence Brown's genus has been doubtfully referred to the same. Dr. Trimen shows, from an examination of Oudney's Herbarium in the British Museum, that Oudneya is identical with Henophyton, Coss., which name it will supersede, having the priority of thirty-one years. The abstract of a communication "On some South American Genera of Plants of Uncertain Position," by Mr. J. Miers, was read by the Secretary. Dr. M. Masters orally gave the leading points of a paper "On the Inflorescence of Crassulaceæ." He discussed the schemes of classification proposed by Roeper and others, as also the emendations of Hofmeister, Sachs, and the modern German school of botanists. He proposed a rearrangement under the heads Monopodial or indefinite, Choripodial or dichotomous, and Pleiopodial or definite, the last comprising the Sympodial varieties. The modifications brought about by suppressions, adhesions, congenital or otherwise, real or apparent, and by displacements of varying kind and degree were alluded to, the general conclusion being that while suppressions and adhesions do occasionally occur, yet in most instances the phenomena witnessed might easily be explained by displacement of parts, and especially of that process of elongation known as uplifting. The history of development as well as the internal structure he believes is consistent with this latter view, but not, as a rule, with the theory of adhesion.

STATISTICAL SOCIETY.

Feb. 18th.—S. Bourne, Esq., in the chair.—The following gentlemen were elected Fellows: Messrs. J. K. Welch, A. Akers-Douglas, R. M'Cheane, jun., H. F. Partridge, and Rev. J. E. Campbell-Colquhoun. Mr. C. Walford read a paper "On the Famines of the World, Past and Present (Part II.)."

ZOOLOGICAL SOCIETY.

Feb. 18th.—Prof. W. H. Flower, President, in the chair.—The secretary exhibited, on behalf of the Rev. T. O. Morris, an example of *Bombyx quercus* with malformed antennæ; a new humming-bird from Northern Peru, which he proposed to name *Thaumatius Taczanowskii;* and a living Amphisbænian (*Bronia Brasiliana*), lately received from Monte Video. Letters and papers were read from Mr. E. L. Layard, on *Pachyciphala icteroides*, Peale, with the description of a supposed new species of the genus from Ovalau, Fiji group, proposed to be called *P. neglecta;* from Dr. A. Günther, on four new species of Chameleons from Madagascar, proposed to be called *Ch. malphe*, *Ch*, *brevicornis*, *Ch. gularis*, and *Ch. globifer;* from Mr. E. A. Smith, on a large collection of Mollusca from Japan, formed by Capt. H. C. St. John; from Messrs. Godman and Salvin, on a number of new species of butterflies from Central and and South America, and on a collection of butterflies made by the Rev. G. Brown in New Ireland; by Mr. A. G. Butler, on the Heterocera contained in a collection from the same locality: from Mr. W. A. Forbes, on the systematic position of the genus Lathmus, in which, from a study of its pterylosis, osteology, and other points in its external and internal structure, he showed that this parrot must be referred to the neighbourhood of the Platycercidæ; by Mr. R. B. Sharpe, on *Heliodilus soumagnei*, Grandidier, of which a specimen had recently been acquired by the British Museum, and on the characters of a second species of the genus Dromæocercus, from Madagascar, proposed to be called *D. Seebohmi;* from Mr. A. Boucard, on two supposed new species of South American birds; and by Dr. F. Day, on the occurrence at Southend of the Little Gurnard, *Trigla pœciloptera*.

March 4th.—Prof. W. H. Flower, President, in the chair.—The secretary read a report on the additions to the society's menagerie during February, and made remarks on examples of two rare fruit pigeons of the genus Carpophaga. Mr. L. M. D'Albertis exhibited some new and rare birds obtained during his recent expedition up the Fly River, New Guinea. Prof. Newton exhibited a specimen of *Sylvia nisoria*, believed to have been killed at Cambridge many years ago. Communications and letters were read from Mr. L. Taczanowski, on the birds collected by Messrs. Stolzmann and Jelski in Northern Peru in 1878; by Mr. R. B. Sharpe, on birds obtained in Kina-Balu Mountain, in North-western Borneo, by the collector of Mr. Treacher; by Mr. F. J. Bell, the first portion of some observations on the characters of the Echinoidea: the present paper contained remarks on the species of the genus Brissus and on the allied forms Meoma and Metalia; from the late Mr. F. Smith, on new species of Hymenoptera from Central America; from Mr. W. A. Forbes, on the Meliphagine genus Myzomela, to which were also added the descriptions of two new species; and from the Rev. O. P. Cambridge, on new and little-known species of Araneides, principally belonging to the genus Gasteracantha.

ARCHÆOLOGICAL INSTITUTE.

March 6th.—R. H. S. Smith, Esq., in the chair.—The Rev. C. F. R. Palmer contributed the first portion of a paper "On the History of the Priory of Dartford," giving a careful account of the foundation of this mother-house of the sisters of the Dominican order. Mr. W. Brown sent a collection of documents from the time of Richard I. to the sixteenth century; some of the seals exhibited figures in so-called "mascled" armour, others were quite antique; Mr. W. D. Powles exhibited a collection of gold objects from ancient Indian graves in Columbia, and spoke at some length upon these interesting ornaments and relics of the Chipcha tribe. They were found fifteen feet below the surface, together, in some instances with deer horne. Mr. Powles described the religious rites and ceremonies of this ancient people, and explained the manner in which they made annual offerings to their deities by casting quantities of treasures of the kind exhibited into certain lakes. Efforts had been made to recover some of these antiquities, but owing to an unfortunate accident that had befallen the explorers, the work has languished. The tribe suffered much at the hands of the Spaniards, and it was greatly to be deplored that its literature had thus perished. The Chairman said that the objects presented, technically, many curious points, and they had a general analogy with gold ornaments of other savage tribes, such, for instance, as those of the Ashantees, who carried on the earlier traditions of interlaced or plaited work by casting, thus imitating the older and higher civilisation. Mr. W. Burger exhibited a pair of mediæval compasses and a small brass figure in armour of St. George and the Dragon, fifteenth century. Mr. W. J. B. Smith sent a delicately chased Japanese arrow-head of steel, with an open-work centre serving for two designs, and a sixteenth century sword from Malta. Mr. R. Ready sent a set of miniatures, among them a good portrait of the second Lord Crewe. Mr. Hartshorne exhibited a pair of candlesticks of copper gilt, finely chased, *temp.* George I. Mr. Sparvel-Bayley sent a coarse Indian bronze dragon dredged out of the Thames.

CHEMICAL SOCIETY.

Feb. 20.—Dr. Gladstone, President, in the chair.—The following papers were read:—"On Colouring Matters derived from Diazo Compounds," by Dr. O. N. Witt; "On some Methods of Vapour Density Determinations," by Mr. G. T. Brown; and "On the Decomposition Products of Quinine and the allied Alkaloids," by Mr. J. J. Dobbie and Dr. W. Ramsay.

March 6th.—Dr. Gladstone, President, in the chair.—The following papers were read:—"On the Quantitative Blowpipe Assay of Mercury," by Mr. G. Attwood; "On the action of Isomorphous Salts in Exciting the Crystallisation of Supersaturated Solutions of each other, and some Experiments on Super-saturated Solutions of Mixed Salts," by Mr. J. M. Thompson; and "On the Isomeric Dinaphthyls," by Mr. W. Smith.

METEOROLOGICAL SOCIETY.

Feb. 20th.—Mr. C. Greaves, President, in the chair.—Eleven new fellows were elected. The following papers were read: "Diurnal Variations of Barometric Pressure in the British Isles," by Mr. F. Chambers; "On a Standard Cistern Siphon Barometer," by Mr. Bogen; "On the Relations existing between the Duration of Sunshine, the Amount of Solar Radiation, and the Temperature indicated by the Black Bulb Thermometer in Vacuo," by Mr. G. M. Whipple; and "Results of Meteorological Observations made at Buenos Ayres," by Mr. W. B. Tripp.

SOCIETY OF ARTS.

Feb. 24th.—The second lecture of the course "On Dwelling Houses, their Sanitary Arrangements and Construction," was delivered by Dr. Corfield.

Feb. 26th.—Sir P. C. Owen in the chair. Three candidates were proposed for election as members. A paper "On Indian Pottery at the Paris Exhibition" was read by Dr. Birdwood.

March 3rd.—The third lecture of his course "On Dwelling Houses, their Sanitary Construction and Arrangements," was delivered by Mr. Corfield.

March 5th.—Dr. B. W. Richardson in chair.—A paper "On the Social Necessity of a Popular and Practical Teaching of Sanitary Science" was read by Mr. J. J. Pope.

March 7th.—Dr. F. Watson in the chair.—A Paper on the Plants of India Adapted for Commercial Purposes" was read before thh Indian section by Mr. J. R. Jackson.

March 12th.—W. Ellis, Esq., in the chair.—A paper "On the Compensation of Watches, Clocks, and Chronometers" was read by Mr. E. Rigg.

GEOLOGICAL SOCIETY.

Feb. 21st.—Annual Meeting.—H. C. Sorby, Esq., President, in the chair.—The Secretary read the reports of the council and of the library and museum committee for the year 1878. The chairman presented the Wollaston gold medal to Prof. Ramsay, for transmission to Prof. B. Studer; the Murchison medal to Prof. Morris, for transmission to Prof. M'Coy; the Lyell medal to Mr. W. W. Smyth, for transmission to Prof. E. Hébert; the Bigsby medal to Prof. Seeley, for transmission to Prof. E. D. Cope; to Prof. Bonney the balance of the proceeds of the Wallaston donation fund, for transmission to Mr. S. Allport; to Dr. H. Woodward the balance of the proceeds of the Murchison geological fund, for transmission to Mr. J. W. Kirkby; to Prof. Judd a moiety of the balance of the proceeds of the Lyell fund, for transmission to Prof. H. A. Nicholson; and to Dr. H. Woodward a moiety of the balance of the proceeds of the Lyell fund. The President then read the anniversary address. The following gentlemen were elected council and officers for the ensuing year: President, H. C. Sorby; vice-presidents, Sir P. de Grey-Egerton, Bart., Prof. P. M. Duncan, Prof. J. Prestwich, and Prof. A. C. Ramsay; secretaries, Prof. T. G. Bonney, Prof. J. W. Judd; Foreign Secretary, W. W. Smyth; treasurer, Dr. J. Gwyn Jeffreys; council, H. Bauerman, Prof. T. G. Bonney, Prof. P. M. Duncan, Sir P. de M. Grey-Egerton, Bart., J. C. Hawkshaw, Dr. H. Hicks, W. H. Hudleston, Prof. T. M'Kenny Hughes, J. W. Hulke, Dr. J. Gwyn Jeffreys, Prof. T. R. Jones, Prof. J. W. Judd, Prof. N. S. Maskelyne, J. Morris, R. W. Mylne, J. A. Phillips, Prof. J. Prestwich, Prof. A. C. Ramsay, Prof. H. G. Seeley, W. W. Smyth, H. C. Sorby, Admiral T. A. B. Spratt, and Rev. T. Wiltshire. Messrs. G. Bond, F. Gaskell, and G. H. Hollingsworth were elected Fellows. The following communications were read: "A copy of a Letter from the late Acting Governor of the Falkland Island, relating to the Overflow of a Peat-bog near Port Stanley, in East Falkland," communicated by H.M. Secretary of State for the Colonies; "Note on *Poikilopleuron Bucklandi*, of Eudes Deslongchamps (père), identifying it with *Megalosaurus Bucklandi*," by Mr. J. W. Hulke; "Note on a Femur and Humerus of a small Mammal from the Stonesfield Slate," by Prof. H. G. Seeley; and "A Review of the British Carboniferous Fenestellidæ," by Mr. G. W. Shrubsole.

HISTORICAL SOCIETY.

FEB. 3RD.—J. Heywood, Esq., in the chair. The society admitted eight ordinary, two corresponding, and three honorary members. Miss H. Taylor read a paper "On Celtic Settlements on the Borders of the Mediterranean;" Mr. Yeatman read a paper "On the Etymology of the Word "Anglo-Saxon;" and General Allan gave the substance of his "Historical Memorials of the Bishopric of Man and the Isles."

PHYSICAL SOCIETY.

FEB. 22ND.—Prof. W. G. Adams in the chair. Rev. Coutts Trotter, Prof. G. D. Liveing, Messrs. J. C. Adams and F. W. Paterson were elected members. Dr. C. W. Siemens described his new electric current regulator. Dr. Schuster then gave the results of some observations of his on the spectrum of lightning. Professor Ayrton exhibited an "exisothermal" model of a cooling globe, the globe in question being a trachyte earth 8000 miles in diameter.

SOCIETY OF ANTIQUARIES.

FEB. 27TH.—The Earl of Carnarvon, President, in the chair.—Mr. A. Franks laid before the society a translation of a paper by Prof. J. J. A. Worsaae, "On the Preservation of Ancient Monuments in Denmark." At a time when a bill of like scope was under discussion, it seemed to him not inappropriate that we should be reminded of the far greater efforts of which a comparatively small country like Denmark had shown itself capable, with a zeal which was beyond all praise. Mr. E. Freshfield communicated a paper "On the Architecture of the Great Mosque at Cordova." This paper was profusely illustrated by plans and photographs.

MARCH 6TH.—Dr. W. Smith, V.P., in the chair.—This being an evening appointed for the ballot, no papers were read. The following gentlemen were elected: Very Rev. E. M. Goulburn, Rev. F. J. Smith, and Rev. J. Hodgson, Messrs. E. R. Robson, C. E. Keyser, A. J. Jewers, J. W. Davis, S. H. Williams, G. L. Gomme, and C. Brewster.

ROYAL SOCIETY OF LITERATURE.

FEB. 20TH.—W. Knighton, Esq., in the chair.—Mr. E. W. Brabrook read a paper "On an Unrecorded Event in the Life of Sir Thomas More," viz., that in December, 1514, he entered himself among the professors of civil law by becoming a member of the Society of Advocates, commonly called Doctors' Commons. The proof of this fact Mr. Brabrook derived from an autograph of Sir T. More he had recently found in the register and obligation book of the society (now preserved in the library at Lambeth Palace), and which is in the following words: "Ego T. Morus 3° die Decembris a° a Christo nato 1514^{to} admissus su in hanc Societata et pollicitor me solutur in annis singulis s. 6 et 8d." Mr. Brabrook argued that More's reason for this step most likely was his constant employment in embassies abroad, and in countries where a knowledge of the civil law was almost indispensable, and where, too, professors of civil law were most frequently chosen for such duties.

MICROSCOPICAL SOCIETY.

FEB. 12TH.—Annual Meeting.—H. J. Slack, Esq., President, in the chair.—The report of the council was presented and read by the secretary. The President read his annual address, in which the oil immersion objectives and the recent discussion on fermentation were referred to. The following Fellows were elected to compose the new council for the ensuing year:—President, L. S. Beale; vice-presidents, Dr. R. Braithwaite, Dr. C. T. Hudson, H. J. Slack, and H. C. Sorby; treasurer, J. W. Stephenson; Secretaries, C. Stewart and F. Crisp; assistant-secretary, W. W. Reeves; members of council, J. Badcock, W. A. Bevington, C. J. Fox, J. Glaisher, A. de Souza Guimaraens, Dr. W. J. Gray, J. E. Ingpen, E. W. Jones, W. T. Loy, Dr. J. Matthews, J. Millar, and T. Palmer. Five Fellows were elected.

INSTITUTION OF CIVIL ENGINEERS.

MARCH 4TH.—Mr. J. F. Bateman, President, in the chair.—The monthly ballot resulted in the election of five members, Messrs. A. Lavalley, B. T. Moore, T. Nicholls, J. L. Stothert, and G. P. Williams: of twenty-six associate members, Messrs. T. A. Allen, C. Barron, J. Bourdeaux, G. B. Bruce, jun., F. J. Rothe, T. St. George Caulfield, B. Clegg, J. Cleminson, A. W. Conquest, H. T. Crook, W. C. Gibbons, A. F. E. Grant, J. R. Grimshaw, E. P. Harrison, H. Kemp, C. J. Nevitt, J. H. Radley, J. H. Riches, G. Seymour, jun., L. B. Simeon, S. H. Terry, E. B. Thornbury, H. P. Vacher, R. W. Walsh, C. J. K. Watson, J. Wilson, and T. H. Yabbicom; and of four associates, Messrs. A. Bedborough, M. Clark, B. Firbank, and J. B. Squire.

ROYAL INSTITUTION.

MARCH 3RD.—The Duke of Northumberland, President, in the chair.—Mrs. E. Pollock, Mrs. E. Round, Mrs. G. Simonds, Mrs. J. Singleton, Mrs. Wills, Rev. T. C. Pratt, Messrs. C. W. Bell, A. Brandreth, J. T. Chance, W. Crookes, H. E. Diamond, S. Forster, C. F. Hardy, D. W. C. Hood, C. E. Jerningham, S. Lanigan, D. Pidgeon, M. S. Pilcher, and J. A. Swanson were elected members.

QUEKETT MICROSCOPICAL SOCIETY.

MARCH 4TH.—H. Lee, Esq., V.P., in the chair.—Eight new members were elected. A vote of condolence with the family of the late Mr. P. Le Neve Foster, a former President of the society, was unanimously passed. Dr. C. T. Hudson gave a description of rotifers as seen by dark-field illumination. Dr. Matthews explained a method for displaying objects by the microscope irrespective of their size by means of an optical arrangement which he termed the micro-megascope.

MARCH 14TH.—A conversazione was given by this society at University College, Gower street, and there was a large gathering of microscopists. The guests were received by Prof. Huxley, the President of the club. The microscopical and natural history clubs of South London, Croydon, New-cross, Hackney, and Sydenham, &c., sent many interesting preparations, and altogether there were more than 250 microscopes on the tables. Among the novelties was the micro-megascope exhibited by Dr. Matthews. Of the many beautiful preparations displayed, a section or translice of the head of a wasp, showing brain, eyes, and mandibles, made Mr. E. T. Newton, was nearly perfect in its way; and a tiny trout, brought by Mr. T. C. White, and magnified so as to show the circulation of the blood, several specimens of the acorn shell (*Balanus balanoides*), shown by Mr. F. Fitch, which kept actively at work, grasping invisible food from the surrounding water, and a curious parasite of the flying fox (*Nycteribiia*), exhibited by Mr. J. W. Goodinge, C.C., attracted special attention. In the mathematical theatre a popular natural history lecture, illustrated upon a screen by means of the oxy-hydrogen light, was delivered by Mr. W. R. May. Mr. John Browning lent his lantern microscope, with which Mr. A. C. Cole exhibited a series of physiological and pathological preparations, and other exhibitions of photographic views, polariscope objects, &c., were given in separate rooms. The shield room, containing Flaxman's collection of drawings, was, by permission of the Council of the college, opened to the visitors. A stringed band, under the direction of Mr. R. W. Barratt, added to the attractions of the conversazione, the great success of which was due to the indefatigable exertions of Mr. J. E. Ingpen, hon. sec., assisted by the members of the committee acting as stewards.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

MARCH 4TH.—Dr. S. Birch, President, in the chair.—Mr. P. Le Page Renouf read a paper "On the True Sense of an important Egyptian Word." A communication from Mr. E. A. Budge, "On a recently discovered Text of Assur-nazir-pal, with Translation and Notes," was read.

ANTHROPOLOGICAL INSTITUTE.

FEB. 25TH.—J. Evans, Esq., D.C.L., V.P., in the chair.—A paper by Mr. S. C. Wake, "On the Primitive Human Family," was read by the director. The author endeavoured to combat some of the views usually associated with the views usually associated with the name of Mr. M'Lennan. Mr. E. W. Brabrook read a paper entitled "Notes on the Colour of the Skin, Hair, and Eyes." The paper accompanied an exhibition of the "Echelle de Coleur," published by the Société Stenochromique of Paris. The accurate determination of the colours of the skin, hair, and eyes is a matter of great interest to anthropologists, and the author of the paper considered that though the object of the publication of this scale of colours was not exclusively anthropological, yet its value to anthropologists would be very great. Forty-two colours are specialised, of each of which there are about twenty shades.

FOREIGN SCIENCE.

At a recent meeting of the Council of the French Scientific Association, M. Mascart, the director of the central bureau of meteorology, entertained his colleagues with statements of a project presensed by the Commission of the Department of Vaucluse on the subject of the establishment of an observatory on the summit of Mount Ventoux. A subscription will no doubt be raised for the purpose. The mountain referred to is situated to the north-east of Carpentras, and the site for the observatory is nearly 7000 feet above the sea level. It will command an extensive view of the Mediterranean coast.

Dr. Jobert, of Rio Janeiro, has discovered a remedy, it is stated, for the injury done to the coffee plants in Brazil by the ravages of certain species of insects. He has closely investigated the matter, and estimates that on one plant there may sometimes possibly exist as many as thirty millions of such parasites.

A Zurich journal states that on the 5th of January last the boring of the St. Gothard tunnel had attained to a length of about forty-five thousand feet. About one-fifth of this length has been done during the past year.

Some useful improvements on the Bunsen battery has been made by M. F. Lefebure.

A simple and ingenious form of night-lamp has been devised by M. Behn, which indicates the hour by the extent of combustion of the oil. Two vertical tubes of glass rise from the vessel or reservoir in which the oil is contained; one of these tubes containing oil and being graduated for the hours, and the other holding the wick saturated with oil for giving the light. The lamp is constructed in such a way that one hour is required to consume the quantity of oil occupying the space between two of the graduations on the first-mentioned tube. Underneath the flame, at one side, a suitable reflector is placed, which throws a luminous beam across the graduated tube. During the night it can thus be seen at what height the oil stands in the tube, and the hour thus ascertained.

The municipal authorities of Heilbron have resolved to have a monument erected in that town in memory of J. R. Mayer, the well-known author of the mechanical theory of heat.

A new apparatus has lately been brought out for signalling by night during time of war. It is especially applicable to signalling on coasts and from fortresses and battlements. The light for signalling is produced by means of a violent current of air passing through the interior of the flame in the oil or other lamp, and is remarkably brilliant in appearance.

SIMPLE TESTS OF WATER.

The complete analysis of potable water requires much chemical skill, but the more common impurities may be detected by comparatively simple tests. Certain deleterious salts may thus be recognised. Among these are the nitrates, whose presence is chiefly significant as showing that organic matter has been acted upon and may be present. The danger is not in the salts themselves but in their source, which should, if possible, be ascertained. To examine water for nitrates, put a small quantity of it in a test tube; add an equal quantity of pure sulphuric acid, using care so that the fluids shall not mix; to this add carefully a few drops of a saturated solution of sulphate of iron. The stratum where the two fluids meet will, if nitric acid be present, show a purple, afterwards a brown colour. If the nitric acid be in minute quantities, a reddish colour will result. The presence of ammonia, if in excess, can be determined by treating the water with a small quantity of potassic hydrate. Ammonia, if present, will be liberated and may be recognised by its odour, or by the white fumes of chloride of ammonium when a glass rod wet with muriatic acid is passed over the mouth of the test tube. If chlorine is present in any form in water used for drinking, it is evidence that sewage contamination in some form exists. The presence and amount of chlorine may be ascertained by the following simple method: Take 9 grains of nitrate of silver, chemically pure, and dissolve it in 200 units (say, cubic centimetres) of distilled water. One unit of the solution will represent 1-100th of a grain of chlorine. Take a small measured quantity of water to be examined, and put into a glass vessel more than large enough to hold it. Add to the water a *small* quantity of the solution; if chlorine be present, a white precipitate will result. Repeat the addition, after short intervals, until no precipitate results. The units of the solution used will determine the hundredths of a grain of chlorine present. If more than a grain of chlorine in a gallon be present, reject the water, unless it can be clearly determined that the excess does not come from sewage. The water should be slightly acidulated with nitric acid before the test is applied.

Several years ago we described and commended Heisch's sugar test for the presence of dangerous organic matter, but it is worth repeating in this connection, being at once simple and trustworthy. Place a quantity of the water in a clean, glass-stoppered bottle; add a few grains of pure sugar and expose to the light in a window of a warm room. If the water becomes turbid even after exposure for a week, reject it; if it remains clear it is safe.—*Boston Journal of Chemistry.*

CHEMISTRY ON THE CONTINENT.

We extract the following from the *Chemical News*:—

Liquefaction of Silicide of Hydrogen.—M. Ogier.—The author has performed this experiment with the apparatus of Cailletet. At ordinary temperatures (about 10°) liquefaction does not take place under pressures of 200 to 300 atmospheres. On the contrary, from 50 atmospheres the cooling due to the release determines the production of a thick mist and of a manifest trickling of liquid down the side of the tube. Under these conditions the gas is at a temperature bordering upon its critical point. It suffices, indeed, to cool it a few degrees below zero in order to effect a total condensation. Hydric silicide is liquid at $-11°$ at the pressure of 50 atmospheres; at $-5°$ under 70 atmospheres; at 1° under 100 atmospheres, whilst at 0° it remains liquid up to 200 atmospheres. The conditions of the liquefaction of this gas resemble those of marsh-gas, with which it has so many analogies.

Determination of Methylic Alcohol in Commercial Methylens.—C. Bardy and L. Bordet. —The authors point out the imperfections of the ordinary process founded on the transformation of methylic alcohol into methyl iodide. They effect the conversion in a special apparatus, a figure of which is inserted in their memoir.

Analysis of an Ethiopian Honey.—A. Villiers.—This honey, known by the natives as *tazma*, is found in subterranean cavities in Ethiopia, and is said to be collected by a species of mosquito. Its composition is:—Water, 25·5; levulose and glucose free from saccharose, 32·0; mannite, 3·0; dextrine, 27·9; ash, 2·5; sundries and loss, 9·1 = 100·0.

Process for Enriching Phosphates with a Carbonated Gangue.—L. L'Hote.—The author heats to bright redness so as to expel the carbonic acid, and then removes the caustic lime formed by lixiviation with very dilute hydrochloric acid. [To the best of our belief a substantially identical process has been for many years in occasional use at the Great Eastern Chemical Works, Stowmarket.]

Experiments Recently Undertaken to Dephosphorise Cast-iron. — M. Gruner. — The author has ascertained that dephosphorisation may be effected in the Bessemer apparatus or the Siemens furnace if the siliceous lining in both is dispensed with and refractory basic materials are used instead.

Metallurgy of Nickel.—As a note to Mr. A. H. Allen's paper translated from the *Journal of the Society of Arts* is appended an illustrated memoir of Badoureau on the treatment of European ores of nickel and cobalt.

The Berlin Aniline Colour Company have issued a lengthy reply to the note of MM. Bindschedler and Busch on malachite green. They deny that a green dye can be industriously prepared from nitrobenzol and dimethyl-anilin by an oxidation process.

PHOTOGRAPHY ON WOOD.

Prof. J. Husnik, in a communication to the *Scientific American* with reference to the above subject, states: I adopted the method of exposing gelatinised paper alone under a negative, and when the chromium salt had been washed out, placing it on a plate of glass and laying on the ink with a very small glue roller. With this I succeeded completely; I obtained beautiful pictures, perfect in the half tones, which could be at once laid on the woodblock, and be printed off at one impression. Gelatine paper can be easily prepared, and kept in stock, according to the process described in my book, *Das Gesammtgebiet des Lichtdrucks*, by placing sheets of paper in a perfectly horizontal position, and coating them with a dilute solution of gelatine, and they need only be sensitized at the moment of use with a one per cent solution of chromate; by this means the above described method is rendered thoroughly simple and practical, as well as being certain in its results. The woodblock itself requires a very simple preparation; it must be rubbed down with whiting to which some adhesive substance has been added. This rubbing can be best effected by the ball of the hand. Gelatine paper can also be purchased from the dealers, and even my own photo-lithographic transfer paper will answer the purpose very well, provided that, before immersing it in the chromatic solution, it be wiped over a few times with a damp sponge, and then rinsed well in clean water. This is done to remove any soluble matter from the surface. Afterwards the paper is dipped for some minutes in a one per cent solution of chromate, then drained, and hung up to dry at an ordinary temperature. Sensitized in this way it remains good for the above-named purpose for from three to five days.

WHAT TO DO IN CASES OF DIPHTHERIA.

In the first place, as diphtheria is a contagious disease, and under certain circumstances not entirely known, very highly so, it is important that all practical means should be taken to separate the sick from the well. As it is also infectious, woollen clothes, carpets, curtains, hangings, &c., should be avoided in the sick room, and only such materials used as can be readily washed.

All clothes, when removed from the patient, should be at once placed in hot water. Pocket-handkerchiefs should be laid aside, and in their stead soft pieces of linen or cotton cloth should be used, and at once burned.

Disinfectants should always be placed in the vessel containing the expectoration, and may be used somewhat freely in the sick room; those being especially useful which destroy bad odours without causing others (nitrate of lead, chloride of zinc, &c.) In schools there should be especial supervision, as the disease is often so mild in its early stages as not to attract common attention and no child should be allowed to attend school from an infected house, until allowed to do so by a competent physician. In the case of young children, all reasonable care should be taken to prevent undue exposure to the cold.

Pure water for drinking should be used, avoiding contaminated sources of supply; ventilation should be insisted on, and local drainage must be carefully attended to. Privies and cesspools, where they exist, should be frequently emptied and disinfected; slop water should not be allowed to soak into the surface of the ground near dwelling houses, and the cellars should be kept dry and sweet. In cities, especially in tidal districts, basins, baths, &c., as now connected with drains, should never communicate directly with sleeping rooms.

In all cases of diphtheria, fully as great care should be taken in disinfecting the sick room, after use, as in scarlet fever. After a death from diphtheria, the clothing disused should be burned or exposed to nearly or quite a heat of boiling water; the body should be placed as early as practically in the coffin, with disinfectants, and the coffin should be tightly closed. Children, at least, and better adults also in most cases, should not attend a funeral from a house in which a death from diphtheria has occurred. But with suitable precautions, it is not necessary that the funeral should be private, provided the corps be not in any way exposed.

Although it is not at present possible to remove at once all sources of disease, yet the frequent visitation of such disease, and especially its continued prevalence, may be taken as sufficient evidence of insanitary surroundings, and of sources of sickness to a certain extent preventible.

It should be distinctly understood that no amount of artificial "disinfection" can ever take the place of pure air, good water, and proper drainage, which cannot be gained without prompt and efficient removal of all filth, whether from slaughter houses, &c., public buildings, crowded tenements, or private residences.

THE BYRON MEMORIAL.

Mr. Belt has finished the Byron Memorial statue in the clay, and it is now ready for casting in bronze. This work was open for competition, Mr. Belt's model being chosen out of several exhibited at South Kensington, and we are sure the committee could not have chosen a more suitable memorial to our great poet. Mr. Belt has drawn his model from the lines in "Childe Harold's Pilgrimage,"

> "To sit on rocks, to muse o'er flood and fell."

The *tout ensemble* is impressive. The poet is sitting in a musing attitude on a rock, with his favourite dog by his side. There is a singular beauty about the head and neck, a depth of look in the eyes, and much suavity expressed in the chin and lips; while the face is an admirable and striking likeness. The hair, too, is exquisitely done. The costume is the favourite one with the poet: the loose coat and cravat, with the falling collar. The trousers are full, and fall with much ease to the shoes. So beautifully is the dog represented, looking up into the poet's face, that the eye is immediately drawn from one to the other, as doubtful which to admire most. We do not know where Mr. Belt procured his model; the creature is of gigantic size, and not unlike a St. Bernard; the hair is beautifully massed, falling occasionally in folds, giving one the impression of great depth. The whole model displays great power of execution and feeling for natural form, the attitude noble, possessing ease and grace from whichever point viewed.

Mr. Belt has exhibited sculpture at the Royal Academy of Arts which has won for him no small share of praise. This is far in advance of either, exhibiting the master hand, and true genius of no ordinary kind.

MAJOR RODWAY'S LIFE-BUOY.

This invention, which we recently described, has, it is reported by the *Torquay Times*, been tested by a crucial experiment. Two of the buoys were enclosed in a small box, heavily weighted with 38lbs. of lead and iron, and thrown into the swimming-bath. The box gradually sank, and the lid being perforated, as soon as the water rushed in through the holes the buoyancy of the apparatus was asserted, for the lid was pushed up and the buoys shot to the surface like rockets. Mr. Wilkinson and a friend plunged into the water, and, by placing the strap of the buoys round their necks with the buoys under their chins, showed how impossible it was for a man to sink under such circumstances. A moderate swimmer, for instance, three miles from land would be perfectly safe; he might swim half a mile, though he could not swim three miles to save his life, but by letting the buoy float behind him he might swim his half mile, then, drawing the buoy round under his chin, float without the slightest exertion until perfectly rested and able to go on again. That the buoys would, immediately upon the immersion of the box, shoot up to the surface, Major Rodway's experiment fully proved. This is a most important fact, for as Major Rodway proposes that the buoys should be kept under the seats round the sides of a vessel, in the case of a vessel sinking instantly, not allowing time even for the covers of the seats to be raised and the buoys to be given out, they would, from their own buoyancy, immediately rise to the surface. The small size of the buoys would allow of an immense number being packed around the vessel's sides, sufficient for almost any number of men and passengers. In these days of calamities at sea, such an invention ought to be thoroughly known, so that a whole nation may not again be plunged into consternation and grief through the loss of hundreds of valuable lives.

THE VALUE OF PRACTICAL MEN.

In a recent lecture on electric lighting, Prof. Tyndall took occasion to say a good word for inventors, practical men, who take up the results of purely scientific investigation and turn them to public advantage. Speaking of the problems involved in electric lighting, Prof. Tyndall said that all the laws of the subject were known, and there was no room for a discovery in the scientific sense, but there was room for the application of such mechanical ingenuity as had given us the sewing machine, the phonograph, and many other things. The investigator and discoverer pursued his theme for the sake of gaining knowledge; the inventor's aim was generally to make money, though he gladly recognised that in many cases the inventor was stimulated by love of his art. Sometimes these men spoke disrespectfully of each other, as Cuvier despised the man of practical application, probably not taking into account that the application of science reacted on science.

The amelioration of the condition of the community was, at any rate, an object worth labouring for. Still, it was well to remember that those discoveries and applications which struck the public mind and excited so much discussion, often come from men whose sole stimulus was an intellectual one. As to the philosophic aspect of the question, there was a small cohort of social regenerators, men of high aims, and for whom he had great respect, who would hand over science and scientific men to a hierarchy which would determine the particular subjects that the scientific man ought to pursue. Where that hierarchy was to get its wisdom they never explained. Those writers denounced and scorned all reference to what they considered to lie far apart from human needs, and yet upon sensible conceptions—as upon molecules, for instance—sometimes depend the greatest discoveries. When the feeble magneto-electric spark was first introduced, an Oxford don expressed his great regret that such a discovery should have been made; for, he said, it put a new and facile instrument in the bands of the incendiary. Let them imagine that hierarchy of which he had spoken watching Faraday fiddling over his magnets. They would certainly have sent him back to the bookbinder's bench as a far more dignified occupation. Yet it was Faraday's spark that now shone, and which he hoped would illuminate our quays and halls, and esplanades and squares, and possibly also our homes.

ANCIENT OLLA MANUFACTORY IN CALIFORNIA.

Paul Schumacher, writing to the *Kansas City Review*, says:—"During my explorations along the Pacific coast I paid much attention to the discovery of the workshops of one of the most beautiful articles of true aboriginal workmanship. It is the *olla*, a cooking vessel made of a species of steatite, the pot stone, or *lapis ollaris* of old, of which Theophrastus and Pliny speak as a material used for the manufacture of vessels among the ancient eastern nations. My observations and notes, which I made while working on the mainland, pointed to the islands in the Santa Barbara channel as the locality in which the manufacture was carried on. I expressed my opinion in my report to the Smithsonian Institution ("Hayden's Bulletin," vol. iii., p. 50), that the site must be looked for on Santa Catalina Island. During my last year's visit to that island, on behalf of the Peabody Museum, I discovered the first quarries in the locality called Pots Valley. The pits and quarries revealed the busy hand of the aborigines, among the *débris*, and in the partly-covered pits where cooking vessels were found in all stages of finish, from the boulder but partly worked out from the rock and still firmly attached to it, the globular form roughly rounded, the boulder in which the excavation has already been commenced, and so on to the smooth-finished pot. All the implements with which the task was accomplished were also found, and, by observing the progress of the work in the many specimens discovered, it was not difficult to ascertain the mode of manufacture, the result of which I made the subject of an essay accompanied by illustrations (*Report of the Peabody Museum*, 1877).

"Not only were cooking vessels extensively manufactured on this island, but also flat dishes (which the Mexicans call *Coniales*), cups, pipes, stone rings which were used as weights for digging sticks, and all kinds of trinkets. These articles constituted the money of the people of Santa Catalina, like the shell beads of the neighbouring island of Santa Cruz, where they were extensively manufactured by the aborigines, and whence they were distributed far along the coast, and to some extent into the interior. The quarries are more abundant in number towards the south-eastern end of Santa Catalina, where for about two miles square not less than three hundred quarries and pits were discovered during my last visit, with a large number of pot-boulders, sherds, tools, &c.

Mould in Cellars.—A German agricultural journal gives the following:—Put some roll brimstone into a pan and set fire to it; close the doors, making the cellar as nearly air-tight as possible for two or three hours, when the fungi will be destroyed and the mould dried up. Repeat this simple and inexpensive operation every two or three months, and you will have your cellar free from all parasitical growth.

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